

UNIVERSITY OF CALIFORNIA



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# ICONES PLANTARUM FORMOSANARUM

NEC NON ET

CONTRIBUTIONES AD FLORAM  
FORMOSANAM.

III.

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AUCTORE

**B. Hayata.**

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## INTRODUCTION

In the first and second fascicles of this work, I treated all Formosan plants belonging to families from the Ranunculaceæ to the Dipsacæ, and it was my desire to treat the remaining families in the present volume so as to complete the flora in the rather compact form of a conspectus. But the new materials with which I have been loaded down since last year, and especially the collections made by myself in my two excursions to the island (in 1912) are so numerous that it has required my whole time to work up even the first part of them, and this has compelled me to put off, for some years, the continuation of the conspectus appearing in the preceding fascicles. The present volume is, therefore, almost wholly devoted to the results of a study of the materials which have been worked up since last year, and the results are here given under the heading, "Contributions to the Flora of Formosa I." All the species are here arranged, as in the preceding volumes, after the system of BENTHAM and HOOKER.

The collections above referred to are really considerable, and it will apparently take my whole time for nearly two years more to work them up thoroughly. Consequently it is probable that two more volumes will be required to present the results of investigations of the materials which are now on my hands. The conspectus mentioned above will, therefore, I trust, be continued by 1915.

In the course of my studies since last year, I have found many new species to be added to the flora of Formosa. Among them, the following genera\* are new to our flora.

*Captis*, represented by *C. Morii* HAYATA which is related to a Japanese species, *C. quenquefolia* MIQ.

*Macleaya*, represented by *M. cordata* R. BR. which is widely distributed through China and Japan, but is rather rare in this island.

*Eutrema*, represented by *E. hederæfolia* F. et S. which is peculiar to Japan and Formosa.

*Cascaria*, represented by *C. Merrilli* HAYATA, which is related to some Philippine species. The genus is mentioned under the Samydaceæ in BENTHAM and HOOKER's fundamental work.\*\* In my opinion, however, it should be referred to the Bixineæ, so far as the present plant is concerned, after the limitation of the two families (Samydaceæ and Bixineæ) mentioned in the same work. The genus is referred to the Flacourtiaceæ § Casearieæ\*\*\* in ENGLER's system.

*Salomonina*, represented by *S. stricta* S. et Z. which exists only in Japan and Formosa.

*Melandrium*, represented by *M. morrisonmontanum* HAYATA and two other species, all endemic to the island.

*Arenaria*, represented by *A. petiolata* HAYATA which closely resembles *A. serpyllifolia* LINN.

*Ryssopteris*, represented by a Philippine species, *R. Cumingiana* A JUSS.

*Chisocheton*, represented by *Ch. kusukusense* HAYATA which is closely related to *Ch. hongkongense* TUTCHER.

*Cassine*, represented by *C. illiciifolia* HAYATA and two other species, all endemic to Formosa.

*Pygmeum*, represented by a Philippine species, *P. Preslii* MERR.

*Sanguisorba*, represented by *S. formosana* HAYATA, which is very near to *S. officinale* LINN.

*Osteomeles*, represented by *O. anthyllidifolia* LINDL. The species is distributed in Japan, the Bonin, Sandwich, Maingai, and Pitcairn Islands.

\* It should be understood that I have not counted in these genera any genus outside of Formosa, though they are mentioned in this work.

\*\* BENTHAM et HOOKER, Genera Plantarum I. p. 791.

\*\*\* ENGLER, A u. GILG, E., Syllabus der Pflanzenfamilien (1912) p. 268.



*Ceriops*, represented by a variety of *C. Condolleana* ARN. The type is a native of the tropical shores of the Old World.

*Monotropa*, represented by *M. uniflora* LINN. The species is widely distributed in Northern India, Central China, Manchuria, Japan and North America.

*Stimpsonia*, represented by a *S. chamædryoides* WRIGHT which is distributed in China, Korea and the Liu-Kiu Islands.

*Geniostoma*. A doubtful species of the genus is known from Kwashōtō Island.

*Fagraea*, represented by *F. Sasakii* HAYATA, which somewhat resembles *F. obovata* WALL.

*Carpinus*, represented by *C. Kawakamii* HAYATA and one other species, all endemic to Formosa.

*Corylus*, represented by a sterile specimen, closely related to *C. rostrata* var. *Sieboldiana* MAX.

*Galeola*, represented by a Malay plant, *G. altissima*.

*Pinanga*, represented by *P. Tushiroi* HAYATA which is closely related to a Philippine species, *P. Barnesii* BECC.

The species and varieties recently added or now to be added number as many as 211.\*

Thus up to the present date, the total number of the flora, so far as is known, is 2918 species belonging to 881 genera and 158 families.

In the present volume, *Mitrastemon Kawasasakii* HAYATA is mentioned under a family different from that to which it was formerly referred. As so great an alteration is a matter of importance, I have given my reasons under a separate heading, "On the systematic Position of *Mitrastemon*, as a Genus representing a special Tribus of the Rafflesiaceæ."

Though the scope of the present work is limited to the study of the Formosan flora, I have included some collections from

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\* It should be understood that plants outside of the island are not counted in this number.

Hainan, Liu-Kiu, and the Bonin Islands, as I consider them to be regions closely related botanically to Formosa.

My readers will notice that I have substituted the word "Volume" for "Fascicle" as used in the preceding portions of the *Icones Plantarum Formosanarum, nec non et Contributiones ad Floram Formosanam*. As each of these portions contains more than two hundred pages and thirty plates, the word "Volume" seems more appropriate than "Fascicle."

In conclusion, I avail myself of this opportunity to tender my hearty thanks to the officials of the government of Formosa, to whom I am much indebted for help in the collection of materials and in the publication of this work.

B. HAYATA.

March 31, 1913, Taihoku and Tōkyō.

## Contributions to the Flora of Formosa

### I.

#### Ranunculaceæ.

##### *Clematis* LEXN.

***Clematis alsomitrifolia*** HAYATA sp. nov. Volubilis; caulis teres leviter 15–16 sulcatus, internodiis 7 cm. longis, ramis angulo 90° divaricatis. Folia opposita biternata, in circumscriptione rotundata vel oblonga, circ. 10 cm. in diametro, segmentis 9 oblongo-ovatis 4 cm. longis 2 cm. latis apice acutis vel breve acuminatis basi rotundatis vel rotundato-cordatis tenuiter coriaceis vel chartaceis 3- vel 5-nerviis, nervis basilaribus tenuissimis, nervis et venis utraque pagine elevatis, petiolis communibus 2 cm. longis vel longioribus, petiolulis ultimis 1– $\frac{1}{2}$  cm. longis. Flores paniculati, paniculis 10–15 cm. longis, terminalibus vel axillaribus, ramosis, ramis divaricatis angulo 90° divaricatis, ramis oppositis, bracteis cuspidatis. Flores maturi non visi. Sepala 4, extus hirsuta margine dense hirsuto-marginata, intus glabra, filamentis glabris, antheris elongatis apiculatis.

HAB. Formosa: Loco non indicato, leg. U. MORI, 1912, Aug.

Near *Cl. ovatifolia* ITO, but differs from it by the biternate leaves and the leaflets with a roundly cordate base, and also in having much smaller flowers.

##### ***Clematis angustifolia*** HAYATA n.n.

*Clematis Leschenaultiana* DC. var. *angustifolia* HAYATA Materials for a Flora of Formosa p. 16.

***Clematis dolichosepala*** HAYATA sp. nov. Scandens; caulis glaber, tenuiter sulcatus, internodiis 12–13 cm. longis. Folia simplicia vel 3-foliolata, petiolis in longitudine variabilissimis 2–7 cm. longis, foliolis in magnitudine variabilissimis 4–8 cm. longis ovato-triangularibus apice obtusis ad apicem brevissime apiculatis basi truncato-rotundatis ad extremitatem acutis ad

petiolum abeuntibus utrinque glabris membranaceo-chartaceis margine integris 3-nerviis, nervis supra impressis subtus tenuissime elevatis apice convergentibus ad summum laminarum attingentibus, interdum præterea nervis basilaribus tenuissimis 2 additis. Flores axillares solitarii longe pedunculati, pedunculis 10 cm. longis supra basin bracteis oppositis instructis, bracteis oblanceolatis 1-2 cm. longis apice apiculatis basi attenuatis. Sepala 5, lanceolato-oblonga,  $3\frac{1}{2}$  cm. longa,  $1\frac{1}{3}$  cm. lata, apice rotundata, ad summum obtuso-apiculata, basi sensim angustata, 3 mm. lata, 7-nervia, extus brevissime denseque hirsuta, intus glabra. Stamina  $\infty$ ,  $1\frac{1}{2}$  cm. longa, filamentis glabris, antheris linearibus 5 mm. longis apice apiculatis. Carpella  $\infty$ , stylo longe sericeo-barbato.

HAB. Hieranzan, leg. S. SASAKI, Feb. 1910, (Fl.).

Near *C. akoensis* HAYATA, but differs from it by the much longer sepals and ovately triangular leaves.

**Clematis Henryi** OLIV. var. **leptophylla** HAYATA n. v. Scandens, caulis glaber, tenuiter sulcatus, fusco-rubescens. Folia opposita membranacea, simplicia, ovato-lanceolata, in magnitudine variabilissima mediocria 15 cm. longa, 5 cm. lata, apice acuminata vel acuminatissima, basi latissima, rotundata rotundato-truncata vel cordata, margine deorsum integra, sursum remote serrata remote mucronato-serrulata vel subintegra, trinervia, præterea 2 tenuissimis nervis addita, utraque glabra, petiolis longis laminam  $\frac{1}{2}$  plo in longitudine aquantibus. Flores axillares solitarii vel gemini, pedunculis 3-5 cm. longis interdum deorsum 2-3-nodosus, ad nodos breve bracteatis, (bracteis oppositis triangulari-lanceolatis hirsutis 2 mm. longis), apice dilatatis. Flores non patentes, semiclausi, vel campanulati, 2 cm. longi, totiusque lati. Sepala 4, ovato-triangularia, 2 cm. longa, 11 mm. lata, apice acuta, margine plicata, partibus plicatis 2 mm. latis, extus brevissime hirsuta, intus glabra sed sursum leviter brevissime hirsuta, basi rotundata- vel rotundato-cordata, basi 2 mm. lata. Stamina  $\infty$ , 3-seriata,  $1\frac{1}{2}$  cm. longa, filamentis complanatis,  $\frac{3}{4}$  mm. latis, 1-nervatis, margine longe sericeo-barbatis barbis 3-4 mm. longis, antheris oblongis  $2\frac{1}{2}$  mm. longis 1 mm. latis apice obtuse acutis. Carpella  $\infty$ , 1 cm. longa sericeo-barbata. Achænia complanato-oblonga facie hirsuta basi

breve rostrato-acuta, apice attenuata ad stylum abeuntia,  $3\frac{1}{2}$  mm. longa  $1\frac{1}{2}$  mm. lata.

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan. 1912.

Differs from the type by the much thinner and less serrate leaves.

**Clematis insulari-alpina** HAYATA sp. nov. (Fig. 1.) Scandens, caulis glaber tenuissime pluri-sulcatus, internodiis 7 cm. longis, foliis et floribus

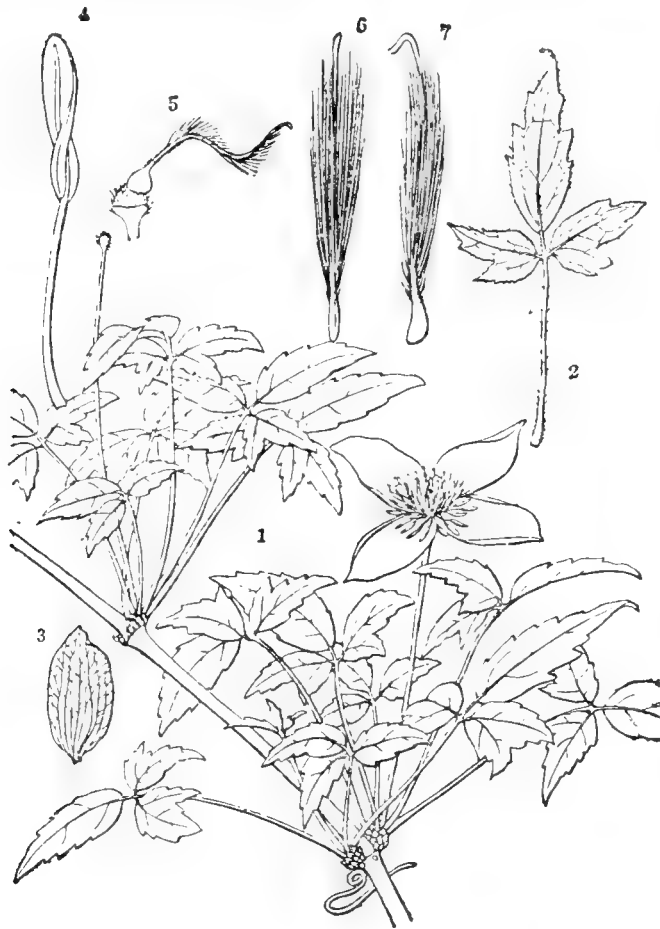


Fig. 1.

*Clematis insulari-alpina* HAYATA. 1, the plant; 2, a leaf; 3, a sepal; 4, a stamen; 5, a carpel on the receptacle; 6, 7, carpels. Fig. 1, 2 and 3  $\times \frac{7}{9}$ ; fig. 4, 5, and 7 more or less magnified.

ad nodos fasciculatis vel ad basin ramorum fasciculatis. Folia ad nodos caulis (vel basin ramorum et florum) fasciculata, trifoliolata, triangularia in circumscriptione, communibus petiolis  $3\frac{1}{2}$  cm. longis hirsutis basi leviter dilatatis intus late sulcatis, foliolis lateralibus sessilibus vel breve petiolulatis, foliolis terminalibus petiolulatis, petiolulis 5 mm. longis; lamina folioli terminalis ovato-lanceolata,  $3\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  cm. lata, apice acuminata, basi cuneata, tenuiter 3-lobata, vel inciso-serrata, utraque hirsuta. Flores ad nodos caulis fasciculati, (sæpe 1-5) longe pedunculati, pedunculis  $7\frac{1}{2}$  cm. longis, tenuiter sulcatis hirsutis. Sepala 4, oblonga, apice obtusa ad summum breve cuspidato-apiculata, basi contracta, 28 mm. longa, 13 mm. lata, basi 2 mm. lata, extus hirsuta intus glabra 7-nervia, patentia. Stamina  $\infty$ , 10-8 mm. longa, antheris linearibus,  $3\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis, apice rotundato-obtusis, basi obtusis. Carpella  $\infty$ , stylo longe albo-sericeo-barbato, stigmate semi-clavato.

HAB. Montibus Formosae, leg. U. MORI, Juli. 1912.

Near *C. Pierotii* MIQ., but differs by the broader sepals and much more hirsute leaves.

### *Thalictrum* LEX.

***Thalictrum micrandrum*** HAYATA sp. nov. (Tab. I.) Herba cæspitosa, radicibus interdum tuberiferis, tumoribus clavatis  $1\frac{1}{2}$  cm. longis, interdum non tuberiferis. Caulis cæspitosus gracillimus 30 cm. altus pauciramosus, sub ramis 1-foliatus. Folia radicalia cum petiolis 25 cm. longa, (petiolis 18 cm. longis) late reniformia in circumscriptione, tri-ternatim pinnata, pinna terminali cum iis lateralibus conformi et æquilonga, pinnulis ultimis petiolulatis, petiolulis cum laminis æquilongis, angulo recto divaricatis; laminis obovato-cuneatis late rhomboideis vel late cordatis, variabilibus in magnitudine, 1-2 cm. longis, margine deorsum integris sursum leviter 5-lobatis, margine desuper tenuissime recurvis, 3-5-nerviis, nervis et venis supra tenuissime, subtus prominente elevatis; petiolis communibus supra sulcatis basi dilatatis, stipulis intrapetiolariis cum petiolis connatis tenuissimis nigricantibus 3 mm. longis margine et apice erosis. Folia caulina biternata, (petiolis communibus 1 cm. longis vel interdum 0) triangularia in circumscriptione.

scriptione 6 cm. longa totiusque lata, laminis pinnularum ultimarum obovato-cuneiformibus, 1–2 cm. longis, versus apicem 3-lobatis. Flores ad apicem ramorum solitarii. Sepala 4, obovata, 3 mm. longa, 2 mm. lata, apice truncata, basi contracta  $\frac{1}{3}$  mm. lata, valde concava, 3-nervia, interdum 2 nervis tenuissimis, addita, nervis lateralibus sursum furcatis. Stamina  $\infty$ , brevissima,  $1\frac{1}{2}$  mm. longa, filamentis 1 mm. longis apice clavatis linearibus antheram in longitudine 2-plo æquantibus, antheris late oblongis  $\frac{2}{3}$  mm. longis. Carpella fusiformia stipitata,  $1\frac{1}{2}$  mm. longa. Achenia recta, fusiformia longe stipitata, cum stipitibus  $4\frac{1}{2}$ –5 mm. longa (stipitibus  $1\frac{1}{3}$  mm. longis), prominente 4-costata, inter costas 1-costulata.

HAB. Kinkwaseki, leg. Y. SHIMADA, 1912, Mai.

Near *T. Fauriei*, but differs from it by the much narrower and shorter filaments of the stamens and much larger form of the plant.

**Thalictrum Morii** HAYATA sp. nov. Caulis solitarius vel pauci-(1–2) fasciculatus, 15 cm. altus, glaberrimus, subteres sursum 1–2-ramosus, sursum 1-foliatus. Folia radicalia 2–3–4, cum petiolis 10 cm. longa, 2-plo vel 3-plo ternatim pinnata, excepto petiolo 4 cm. longa totiusque lata triangularia in circumscriptione, pinnulis ultimis cuneato-obtriangularibus circ. 1 cm. longis sursum trilobatis, (lobis obtusis rursus 3-lobulatis) obscure trinerviis, venis laxè reticulatis, nervis et venis utraque pagine elevatis, subtus marginatis, membranaceo-chartaceis, petiolis communibus 6 cm. longis supra  $\pm$  sulcatis basi dilatatis, stipulis tenuissimis membranaceis adnatis intrapetiole apice integris. Folia caulina sessilia, 3-foliolata, petiolulis 6 mm. longis, foliolis cuneato-obovatis rursus 3-lobatis 1 cm. longis. Flores ad ramos terminales. Sepala obovato-oblonga, 5 mm. longa, 2 mm. lata, apice truncato-obtusa, basi  $\pm$  angustata, ad insertionem  $\frac{1}{3}$  mm. lata, trinervia. Stamina  $\infty$ , filamentis apice clavato-dilatatis, antheris elongato-ellipticis apice truncato-emarginatis basi lobato-emarginatis  $\frac{2}{3}$  mm. longis. Carpella  $\infty$  fusiformia,  $\pm$  obliqua, stipitata, stylo brevi apice complete recurvo stigmatoso.

HAB. Tonkurankei, leg. U. MORI, Aprili. 1910.

Near *T. Fauriei* HAYATA, but differs by the longer anthers and cuneately based leaves.

**Thalictrum sessile** HAYATA sp. nov. (Fig. 2.) Herba 60 cm. alta, caulis glaber in exsiccatō pluri-sulcatus supra medium furcatim ramosus. Folia radicalia non visa, caulina rotundato-triangularia, 15 cm. longa, (petiolis communibus 4 cm. longis, basi dilatatis caulem semiamplectantibus), ternatim pinnata, pinnis lateralibus 8 cm. longis rursus pinnatis, pinnulis ultimis obovato-rotundatis 22 mm. longis totiusque latis apice 5-lobatis basi late cuneatis, lobis oblongis apice rotundatis, mediis majoribus, subtus pallidioribus, pinnulis lateralibus minoribus obliquis oppositis petiolulis ultimis

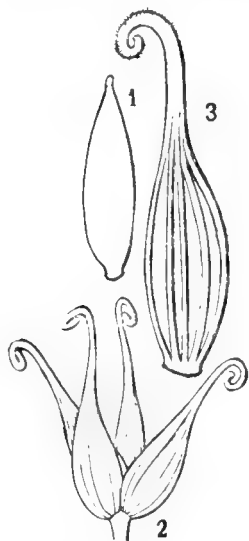


Fig. 2.

*Thalictrum sessile* HAYATA.  
1, a premature carpel; 2, mature  
carpels; 3, one of the same.  
All figures magnified.

latelariibus 5 mm. longis, iis terminalibus 15 mm. longis. Flores versus apicem ramorum cymose laxè dispositi, pedicellis ultimis 1 cm. longis. Flores apertientes non visi. Receptaculum fructiferum clavato-globosum  $\frac{1}{3}$  mm. in diametro. Stamina filamenta apice  $\pm$  dilatata, claviformia, antheris oblongis  $\frac{2}{3}$  mm. longis  $\frac{1}{3}$  mm. latis apice apiculatis. Carpella matura sessilia ellipsoidea, fusiformia,  $\pm$  complanata, 8-costata, 3 mm. longa, 1 mm. lata, basi contracta, apice subito attenuata, ad stylum persistentem apice recurvum  $1\frac{1}{2}$  mm. longum abeuntia.

HAB. Mt. Morrison, leg. U. MORI, Dec. 1909; Tôhōzan, leg. S. SASAKI, Oct. 1909.

Near *T. actæfolium* S. et Z., but differs from it in having deeply lobed leaflets with acute or truncate obes but not obcordate ones as is the case with the congener.

### *Anemone* LINN.

**Anemone stolonifera** MAXIM. Mél. Biol. IX. p. 605; MATSUM. Ind. Pl. Jap. II.-2, p. 105; NAKAI Fl. Koreana II. p. 429.

HAB. Montibus centralibus, leg. U. MORI, 1912.

DISTRIB. Mountains of Japan; Corea: Quelpært.



***Ranunculus* LINN.**

***Ranunculus cheirophyllus* HAYATA n. n.**

*Ranunculus Kawakamii* HAYATA Mater. Fl. Formos. p. 19; Ic. Pl. Formos. I. p. 27, t. 6, (non MAKINO).

As the name *R. Kawakamii* had already been given to a Japanese plant, it is much desirable to give to the Formosan plant another new name, *R. cheirophyllus*.

***Ranunculus geraniifolius* HAYATA sp. nov.** Radices fibrosæ ± tuberoso-incrassatæ; caulis basi repens ad nodos radices non emittens, patento-hirsutus 20 cm. longus, sursum erectus, partibus erectis 10 cm. longis 1-2-ramosis. Folia radicalia cum petiolis 7 cm. longa, lamina late triangularia in circumscriptione, 28 mm. lata 17 mm. longa, herbacea, basi late cordata, alte 3-lobata vel 3-fida, lobo terminali cuneiformi 1½ cm. longo 9 mm. lato apice 3-lobato, (lobis oblongo-triangularibus apice acutis), lobis lateralibus oblique cuneiformibus obliquis latere superiore lobo 1, latere inferiori lobis 2 instructis, (lobis triangulari-acutis), sinibus inter lobos obtusis; lamina trinervia, nervis 60°-90° a se egressis, utraque pagine patento-hirsuta, pilis fulvescentibus, petiolis 5-6 cm. longis hirsutis intus late et tenuiter sulcatis basi dilatatis vaginatis basi amplexicaulibus vaginis latere uno fissis 1 cm. longis in explicatio 4 mm. latis trinerviis extus patento-hirsutis intus glabris. Flores terminales vel solitarii longe pedunculati, pedunculis gracillimis 5 cm. longis patento-hirsutis. Flores apertientes non visi; torus fructifer oblongo-clavatus, 3 mm. longus 1½ mm. latus. Achænia semi-rotundata 1½ mm. longa, basi obliqua acuta, apice rotundata, complanata, dorso ventralique tenuissime costata, facie lævia sub microscopio minute obscureque punctata.

HAB. Mt. Morrison, 11000 ped. alt., leg. S. SASAKI, 1908.

***Ranunculus leiocladus* HAYATA sp. nov.** (Fig. 3.) Radices ± incrassatæ; caulis 2-3-cæspitosus, 25 cm. longus. Folia fere omnia radicalia longe petiolata, petiolis 10 cm. longis basi dilatatis, (partibus dilatatis ovatis 5 mm. longis 3 mm. latis), lamina simplici (vel tripartita), late semi-rotundata 2½ cm.

longa 3 cm. lata 3-lobata vel tenuiter 5-7-lobata, apice obtusa, basi truncata vel truncate-cordata, ad extremitatem subito acuta ad petiolum abeunti, 3-vel 5-nervia lobo terminali 8 mm. longo 11 mm. lato; si lamina tripartita, triangulari in circumscriptione,  $2\frac{1}{2}$  cm. longa  $3\frac{1}{2}$  cm. lata, segmento terminali obovato-cuneiformi  $2\frac{1}{2}$  cm. longo 9 mm. lato basi subito cuneato-attenuato, ad petiolulum 5 mm. longum attenuato, segmentis lateralibus cuneiformibus obliquis 2 cm. longis 1 cm. latis segmento terminali conformibus tenuissime 5-lobatis, lobis triangularibus obtusis glabris. Caulis usque ad medium non ramosus aphyllus sursum pauci-ramosus, sub ramis foliis 1 instructus, foliis caulinis vel bracteis

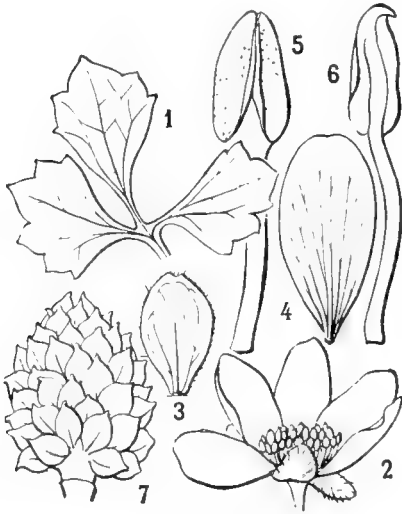


Fig. 3.

*Ranunculus leiocladus* HAYATA. 1, a leaf; 2, a flower; 3, a sepal; 4, a petal; 5, 6, stamens; 7, a syncarp. Fig. 1, natural size; others magnified.

sessilibus 3-fidis, segmentis divaricatis lineari-lanceolatis  $1\frac{1}{2}$  cm. longis. Flores laxissime cymosi vel solitarii axillares vel terminales longe pedunculati, pedunculis 2-3 cm. longis, bracteis interdum trifidis vel interdum simplicibus lanceolatis 1 cm. longis. Sepala 5, oblonga 4 mm. longa, utrinque obtusa, 2 mm. lata, intus glabra, extus hirsuta. Petala 5, obovato-oblonga, 1 cm. longa 4 mm. lata, apice rotundata, basi obtusa, contracta, vel unguiculato-contracta, intus basi sacculo minuto uno instructa. Stamina  $\infty$ ,  $2\frac{1}{2}$  mm. longa, antheris linearibus exteriore leviter recurvis. Achenia matura non visa.

HAB. Tōyen: Chūreki, leg. Y. SHIMADA, 1909, Mart., Fl.

Near *R. ternatus*, but differs in having oblong petals and hirsute sepals.

***Ranunculus sceleratus* LINN.; MATSUM. et HAYATA, Enum. Fl. Formos.**  
p. 8.

HAB. Kelung, leg. S. SASAKI, 1910, Aprili.

**Ranunculus Sieboldi** MIQ. in Ann. Mus. Bot. Lugd. Bat. III. p. 5.

HAB. Nagodake, Loo-choo, 1907, Aprili. leg. G. NAKAHARA.

DISTRIB. Loo-choo; Shanghai?

***Coptis* SALISB.**

**Coptis Morii** HAYATA sp. nov. (Tab. II.) Herba perennis, rhizoma ignotum. Folia omnia radicalia longe petiolata, lamina chartacea palmatim 5-foliolata, (foliolis sessilibus), in ambitu late pentagona  $5\frac{1}{2}$  cm. longa 6 cm. lata, foliolo terminali rhombeo-cuneato  $3\frac{1}{2}$  cm. longo 2 cm. lato apice triangulari-acuto basi cuneato-acuto inciso-3-lobato, lobis approximatis, lobo terminali cuneato-obovato 16 mm. longo 11 mm. lato inciso-3-lobato, lobis serratis, serris aristatis; foliolis lateralibus cum eo terminali conformibus sed  $\pm$  minoribus, iis basilaribus valde obliquis inciso-2-lobatis, lobis inciso-3-lobulatis, lobulis inciso-serratis, foliolis omnibus margine medio sursum serratis, serris 2-3 mm. longis acutis ad apicem aristis 1 mm. longis instructis, medio deorsum integris; foliolis omnibus 3-nerviis, nervo centrali valido, iis lateralibus tenuibus, omnibus supra prominente distincteque elevatis, venulis elevatis, grosse elevato-reticulatis, ad nervos et venas sub lente minute pubescentibus, subtus omnibus planis indistinctis, pagine supra viridibus, subtus pallidissimis glabris, petiolis 13 cm. longis gracilibus glabris, stipulis evanescentibus, reliquis fibrosis. Scapi erecti exserti, elongati, graciles, aphylli, glabi, 28 cm. longi, 1-2 mm. in diametro sectionis simplices vel pauci-ramosi, bracteis basi pedunculorum linearibus 3 mm. longis, ad basin pedunculorum adnatis, pedunculis 5-6 cm. longis. Flores terminales, plerumque solitarii, apertientes 18 mm. in diametro. Sepala 5, petaloidea, oblonga, 8 mm. longa, 5 mm. lata, apice rotundato-obtusa, minute 3-mucronata, basi breve cuneata, ad insertionem 1 mm. lata margine integra. Petala 5, minuta, spathulata 3 mm. longa, sursum  $\frac{2}{3}$  mm. lata, deorsum  $\frac{1}{3}$  mm. lata, facie extus plana, intus sursum elevata. Stamina circ. 20, circ. 4 mm. longa, filamentis filiformibus  $\pm$  complanatis, antheris orbicularibus  $\frac{1}{2}$  mm. latis  $\pm$  emarginatis. Carpella circ. 10-12, complanato-lineararia cum stipitibus  $3\frac{1}{2}$  mm. longa  $\frac{2}{3}$  mm. lata, latere facieque costata, apice revolutorecurva, stigmatibus 1 mm. longis tenuissime pubescentibus. Folliculi oblongo-ovati, complanati, 4 mm. longi 2 mm. lati, apice oblique acuti, basi acuti, facie

1-costati, sutura dorsali sursum deliscentes, stipitibus 4 mm. longis cum costis hirsutis, 5- 6-spermi. Semina glabra ellipsoidea  $1\frac{1}{2}$  mm. longa, rubra.

HAB. Rontabunzan, leg. U. MORI, Aprili, 1910.

Near *C. queneqfolia* MIQ., but quite distinguishable from it by the for much larger leaves.

## Dilleniaceæ.

### *Dillenia* LINN.

**Dillenia** sp.

HAB. Hainan, leg. Z. KATSUMATA, 1910. Too imperfect for determination.

## Anonaceæ.

### *Uvaria* LINN.

**Uvaria dolichoclada** HAYATA sp. nov. Ramuli dense ferrugineo-tomentosi. Folia obovato-elliptica vel elliptica, chartacea, 10-15 cm. longa 5-6 cm. lata, apice rotundata ad summum breve acuta, basi rotundata vel cuneata ad extremitatem cordata, utraque pagine tenuiter stellato-hirsuta, costis et venis supra impressis subtus elevatis, venis primariis lateralibus utroque latere 12-13, petiolis brevissimis 2 mm. longis incrassatis. Flores axillares solitarii, vel ad apicem ramorum pedunculorum gemini, bracteis oblongis 3-5 mm. longis. Flores  $2\frac{1}{2}$  cm. in diametro. Sepala 3 late triangularia basi connata, utraque pagine dense hirsuta. Petala 5? crassiuscula, rotundato-cuneata, apice rotundata, basi late cuneata, 12 mm. longa 10 mm. lata, utraque pagine brevissime denseque pubescentia, basi 2 mm. lata, imbricata. Stamina  $\infty$ , iis extimis sterilibus vel fertilibus circ. 5 mm. longis latissimis linearibus apice  $\pm$  dilatatis  $1\frac{1}{2}$  mm. latis basi cuneato-angustatis, intimis angustioribus 1 mm. latis, antheris  $2\frac{1}{2}$  mm. longis connectivis productis, partibus productis  $1\frac{1}{2}$  mm. longis, filamentis 1 mm. longis. Carpella  $\infty$ , linearia,  $3\frac{1}{2}$  mm. longa, dense pilosa, apice glabra.

HAB. Hainan, leg. N. KONISHI, 1908, Juni. (No. 58 et 55).

**Uvaria obovatifolia** HAYATA sp. nov. Ramuli graciles teretes dense ferrugineo-tomentosi. Folia alterna, subsessilia, obovato-elliptica, 20 cm. longa, 8 cm. lata, chartaceo-coriacea vel tenuiter coriacea, apice rotundato-obtusa ad summum breve cuspidato-acuta, basi gradatim cuneato-angustata ad extremitatem leviter cordata, margine subintegra, in exsiccato supra fuscentia subtus fulvescentia, pinnivena, venis lateralibus primariis utroque latere costæ 14-15, venis sursum arcuatis, costis et venis supra impressis subtus prominentibus, ad costas et venas tomentosa, utraque pagine stellato-hirsuta, petiolis brevissimis 3 mm. longis dense tomentosis. Flores axillares solitarii, pedunculis 2 cm. longis prope basin 1-bracteatis, bracteis parvis oblongis 5 mm. longis. Flores patentes  $3\frac{1}{2}$ -4 cm. in diametro. Sepala 3, late rotundata, utraque pagine breve denseque tomentosa, 7 mm. longa 9 mm. lata, basi connata. Petala 6, imbricata, obovato-cuneata,  $2\frac{1}{2}$  cm. longa, 12 mm. lata, apice rotundata, basi cuneata, ad basin  $2\frac{1}{2}$  mm. lata, utraque pagine brevissime et denseque pubescentia. Stamina  $\infty$ , circ. 10-seriata æquilonga, eā extima staminodia; staminodia circ. 1 cm. longa 1 mm. lata linearia, apice gradatim dilatata,  $1\frac{1}{2}$  mm. lata, apice truncato-obtusa,  $\pm$  plicata, basi attenuata. Stamina fertilia angustiora quam staminodio, 1 mm. lata, linearia, partibus antheriferis 4 mm. longis, loculis antherarum linearibus adnatis, connectivis apice productis, partibus productis 3 mm. longis apice obtusis, filamentis 2 mm. longis. Carpella  $\infty$  linearia, 7 mm. longa, dense tomentosa, apice glabra, stigmate latere canaliculato.

HAB. Hainan, leg. KATSUMADA, 1909.

Near *U. alba*, but differs by the much narrowed base of the leaves.

**Uvaria purpurea** BLUME, Fl. Jav. Anon. p. 13, t. 1 et t. 13-A; BENTH. Fl. Hongk. p. 9; FORBES et HEMSL. Ind. Fl. Sin. I. p. 26.

HAB. Hainan, leg. KATSUMADA, 1910.

DISTRIB. Malay archipelago and Hongkong.

**Uvaria** sp. nov. Near *U. purpurea* BLUME; but differs in having lanceolate petals and much smaller leaves; too imperfect for describing.

HAB. Hainan, leg. KATSUMADA, 1910.

*Anona* LINN.*Anona reticulata* LINN.

HAB. Akō, cult.

## Menispermaceæ.

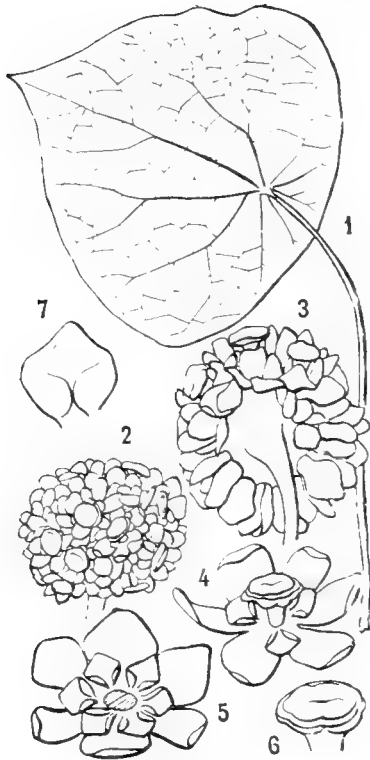
*Stephania* LOUR.

Fig. 4.

*Stephania cepharantha* HAYATA. 1, a leaf; 2, a flower-head, seen from above; 3, the same, seen from below; 4, a flower with three petals; 5, another flower with six petals, staminal column, taken off; 6, a staminal column; 7, a petal. Fig. 1, natural size; others more or less magnified.

*Stephania cepharantha* HAYATA sp. nov. (Fig. 4). Rami gracillimi striati, glabri. Folia glaberrima tenuissime herbacea, rotundato-triangularia,  $4\frac{1}{2}$  cm. lata, totiusque longa, subtus pallida, apice obtusa ad centrum summi mucronata, basi peltata rotundata vel truncata nec emarginata nec sinuata, margine subintegra vel  $\pm$  undulata, 7-9-nervia, longe petiolata, petiolis 6-7 cm. longis gracillimis glabris. Flores capitulati, capitulis racemosis, racemis axillaribus solitariis 7-8 cm. longis gracillimis, pedunculis capitulorum gracillimis 13 mm. longis basi 1-bracteatis, bracteis stipitatis laminis oblongo-triangularibus  $1\frac{1}{2}$  mm. longis 1 mm. latis; rhachidibus racemorum et pedunculis capitulorum complanatis. Capitula disciformia rotundata 6 mm. in diametro, receptaculis peltatis 4 mm. in diametro, flores 19-20 gerentia. Flores medio descis; sepalis 4, lineari-spathulatis  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis; petalis 4, rotundatis carnosius  $\frac{1}{2}$  mm. in

diametro, interdum brevissime unguiculatis. Staminum columna 1 mm. alta, apice peltatim dilatata, peltis rotundatis circ. 1 mm. in diametro margine antheras annulares gerentibus.

HAB. Kelung, leg. S. SASAKI, 1911, Aprili.

Near *Stephania tetrandra* MOORE, but differs from it by the quite glabrous leaves with rounded peltate bases.

## Berberideæ.

### *Berberis* LINN.

***Berberis aristato-serrulata* HAYATA sp. nov.** (Fig. 5). Rami gracillimi

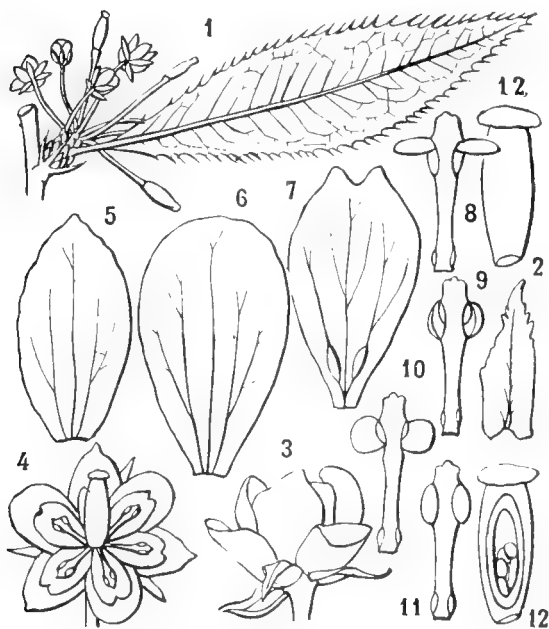


Fig. 5.

*Berberis aristato-serrulata* HAYATA. 1, a part of a branch; 2, an outermost sepal; 3, a flower; 4, the same, seen from above; 5, an outer sepal; 6, an inner sepal; 7, a petal; 8, 9, 10, 11, stamens; 12, an ovary; 12', the same, walls partially taken off, ovules are seen. Fig. 1, natural size; others enlarged.

striati cinerascetes aculeati, aculeis ternatis, 4 mm. longis alternis a se 5-6 cm. distantibus, ramis foliiferis brevissimis 5 mm. longis, basi perulis triangulari-cuspidatis suffultis ad axillas aculeorum sitis. Folia ad ramos brevissimos ternatim disposita, lanceolata,  $5\frac{1}{2}$  cm. longa 17 mm. lata, utrinque acuta, costis supra impressis, subtus elevatis, venis et venulis supra tenuissime, subtus prominente elevatis, tenuiter coriacea margine serrulata, serrulis aristatis ascendento-erectis, petiolis 5 mm. longis. Flores

fasciculati, fasciculis 10–15 floratis, ad apicem ramulorum brevissimorum terminalibus basi perulis vel bracteis plurimis suffultis, bracteis oblongis  $1\frac{1}{2}$  mm. longis apice bi-aristatis vel obtusis, pedicellis 1 cm. longis. Sepala 9, in forma et magnitudine variabilissima, exterioribus 3 minoribus triangulari-oblongis  $2\frac{1}{2}$  mm. longis apice acuminatis, interioribus 6 majoribus obovatis  $5\frac{1}{2}$  cm. longis 4 mm. latis apice rotundatis basi cuneatis a basi  $1\frac{1}{2}$  mm. latis, margine tenuibus, 3-nerviis. Petala 6, obovato-spathulata, 5 mm. longa  $2\frac{1}{2}$  mm. lata, apice rotundata, bi-apiculata, basi cuneata, a basi  $1\frac{1}{2}$  mm. longa, prope basin 2-glandulosa, glandulis elevatis 1 mm. longis oblongo-fusiformibus. Stamina 6, patulis opposita, 3 mm. longa, patulis breviora, filamentis complanatis incrassatis 2 mm. longis, antheris  $\frac{2}{3}$  mm. longis, connectivis productis obtusis. Ovarium obovoideo-cylindricum, 3 mm. longum 1 mm. latum, infra stigma leviter contractum, 1-loculare, 2-ovulata, stigmate dilatato sessili peltato crassiusculo.

HAB. Montibus Centralibus, Aprili. 1910.

Near *B. Wallichiana*, *B. Barandana*, and *B. Kawakamii*, but differs from them by the aristately serrulate leaves.

***Berberis brevisepala*** HAYATA sp. nov. Rami cinerascetes, glabri, cortice longitudinaliter fisso gradatim soluto, aculeati, aculeis ternatis 11 mm. longis, utraque latere stipulo triangulari uno instructis. Folia ad ramulos brevissimos ad axillas aculeorum sitos ternatim verticillatimque disposita, obovato-lanceolata,  $5\frac{1}{2}$  cm. longa,  $1\frac{1}{2}$  cm. lata apice aristato-acuta, basi cuneato-attenuata, valde coriacea, costa supra impressa basi elevata venis lateralibus primariis utroque latere costæ 3–4, ad medium furcatis vix conspicuis margine serris aristatis 3 utroque latere instructa, fere sessilia. Flores 7–8-fasciculati, fasciculis ad ramos brevissimos terminalibus, basi perulis multiseriatis suffultis, pedicellis florum 1 cm. longis. Flores non visi.

HAB. Mt. Morrison, leg. U. MORI, 1910, Aprili.

Seems to be different from *B. Kawakamii* HAYATA by the less dentate leaves.



Nymphæaceæ.

*Nymphæa* LINN.

**Nymphæa tetragona** GEORG. Compared with a specimen in the Tōkyō Herbarium.

HAB. Hainan, leg. KATSUMADA.

DISTRIB. Japan, China, North India and Siberia.

Papaveraceæ.

*Corydalis* DC.

**Corydalis campulicarpa** HAYATA sp. nov. Herba 30–40 cm. alta. Folia alterna bipinnata vel pinnata, pinnis pinnatifidis, pinnulis obovatis basi acuminato-cuneatis, lobulatis, lobulis rotundatis obtusis. Flores racemosi, racemis terminalibus, bracteis minutis linearibus lanceolatis. Capsula linearis 2–3 cm. longa 2 mm. lata, multo crispata, apice cum stylis persistentibus rostrata.

HAB. Taitō, Daironkōsha, leg. U. MORI (No. 2183), 1906, Nov.

Near *C. formosana* HAYATA, but differs from that by the rather rounded smaller seeds.

**Corydalis decumbens** PERS., FORBES et HEMSL. Ind. Fl. Sin. I. p. 37.

HAB. Yenshiryō, leg. T. SŌMA, Feb. 1912. Compared with a specimen in the Tōkyō Herbarium.

DISTRIB. China and Japan.

**Corydalis omphalocarpa** HAYATA sp. nov. Herba 20–30 cm. alta. Folia alterna divaricata, 15 cm. longa 10 cm. lata, a caule angulo 90° egressa vel minus divaricata, bipinnata, pinnis infimis 5 cm. longis rotundato-cuneatis, (5 mm.–10 mm. longis) lobulatis, lobulis obtusis ad apicem mucronatis, petiolis communibus 5 cm. longis basi plus minus dilatatis. Flores 1 cm. longi, breve racemosi, racemis oppositifoliis 1 cm. longis, bracteis linearibus. Sepala 2

caducissima, cuspidato-triangularia, 1 mm. longa, apice cuspidata  $\pm$  lobata vel integra. Petala 4, inæqualia, horizontaliter conniventia, exteriora majora apice naviculiformia angustata (supremum brevissime calcaratum vel haud calcaratum) 1 cm. longa 1½ mm. lata sursum apice  $\pm$  dilatata emarginata dorso medio carinato-alata, interiora 1 cm. longa unguiculata (unguibus 5 mm. longis), laminis cuneato-spathulatis 5 mm. longis apice 1½ mm. latis rotundatis ad centrum mucronatis basi angustatis dorso medio carinatis. Stamina 6, in phalanges 2 petalis exterioribus oppositas in toto longitudine coalita, phalangibus 6 mm. longis basi 1 mm. latis complanatis supra medium sursum filiformibus, antheris mediis phalangis bilocularibus, lateralibus unilocularibus. Capsula linearis 3–3½ cm. longa 3 mm. lata apice cum stylo persistente longe rostrata  $\pm$  curvata vel fere recta. Semina complanato-subrotundata, nigra, nitida, in multiseriatis annulos punctata.

HAB. Nantō : Montibus, leg. U. MORI, 1911.

Near *C. formosana* HAYATA, but differs from it by the not spurred petals, smaller flowers and narrower bracts.

**Corydalis orthocarpa** HAYATA sp. nov. Herba 10–20 cm. alta. Folia radicalia 15 cm. longa (petiolis communibus 7 cm. longis) bipinnata, pinnulis inciso-lobulatis obovatis basi subito cuneatis, lobulis obtusis mucronatis. Flores racemosi, racemis terminalibus vel oppositifoliis 5–6 cm. longis, bracteis lanceolatis vel ovato-lanceolatis. Sepala 2 caducissima, rotundata, margine denticulata, 1 mm. longa. Petala 4, inæqualia; exteriora: supremum maximum cum calcar 18 mm. longum 4 mm. latum, (calcar 2 mm. longo totiusque lato desuper recurvo obtuso), apice latissimum emarginatum, naviculiforme dorso medio carinatum; infimum 13 mm. longum 2 mm. latum apice naviculiforme dorso medio carinatum basi ecalcaratum; interiora 13 mm. longa, unguiculata, unguibus 6 mm. longis ½ mm. latis, laminis spathulatis 7 mm. longis 2½ mm. latis medio dorso alatis (alis ultra apicem laminæ productis), basi latere superiore brevissime auriculatis. Capsula linearis, leviter curva vel recta, 5 cm. longa 2½ mm. lata apice ad stylum abeuns, stigmate T-formi. Semina ignota.

HAB. Fokien : Usekisan, leg. S. NAGASAWA, (No. 149), 1910, Juli.

*Macleya* R. BR.

***Macleya cordata*** R. BR.; DIELS Fl. Centr. Chin. p. 353; MATSUM. Ind. Pl. Jap. II.-2, p. 146.

*Beconia cordata* WILLD.; FORBES et HEMSL. Ind. Fl. Sin. I. p. 35.

HAB. Ritōzan, ad 6500 ped. alt., Aug. 1913, leg. T. KAWAKAMI.

DISTRIB. China and Japan throughout.

## Cruciferæ.

*Nasturtium* BR.

***Nasturtium globosum*** TURcz.; FORBES et HEMSL. Ind. Fl. Sin. I. p. 39; NAKAI Fl. Koreana I. p. 51.

HAB. Maisha, leg. T. SŌMA, Oct. 1910.

Compared with a specimen in the Corean collections in the Tōkyō Herbarium.

DISTRIB. Siberia; China: Peking, Kwangtung; Corea.

***Nasturtium sikokianum*** F. et S. var. **axillare** HAYATA n. v. Herba glabra caespitosa radiatim procumbens, sursum ascendens, ramosa, ramis erecto-ascendentibus glabris 10 cm. longis. Folia radicalia circumscriptione spathulata, 7 cm. longa, sursum latissima 3 cm. lata, apice obtusa, basi cuneato-attenuata in circumscriptione, pinnatifida, sessilia, (segmentis dentatis vel acuto-lobatis, terminali ovato, lateralibus horizontaliter patentibus vel descendentibus infimis 5 mm. longis), ad basin dilatata caulem semi-amplectantia. Folia caulina alterna obovato-spathulata, pinnatifida 4-2 cm. longa interdum grosse dentata. Flores semper axillares, solitarii, sessiles vel brevissime pedicellati. Sepala obovata, 2 mm. longa 1 mm. lata, apice obtusa, basi subcuneata, intus glabra dorso sursum muricata. Petala spathulata 2½ mm. longa, ½ mm. lata basi unguiculata, (unguibus 1 mm. longis), apice rotundato-emarginata. Stamina 6, filamentis complanatis. Ovarium complanatum, cylindraceum 1½ mm. longum ⅔ mm. latum. Siliqua brevissime pedicellata

cylindracea complanata, 8 mm. longa, circ. 2 mm. lata, glabra, utraque obtusa. Semina numerosa oblique reniformia  $\frac{1}{2}$  mm. lata, testa reticulata.

HAB. Fokien: Kosan, leg. S. NAGASAWA, Aprili. 1910. (No. 258.)

Differs from the type by the much larger bracts which are so large as cauline leaves. Petals are usually in a transitional stage between stamens and themselves. They have very often an anther-cell on one side. I could find but one normal petal out of several which I examined in many flowers.

### *Arabis* LINN.

***Arabis kelung-insularis* HAYATA** sp. nov. Perennis?, erecta 30 cm. longa, sursum ramosa, brevissime stellato-hirsuta. Folia radicalia non vissa. Folia caulina inferiora ovata, 5 cm. longa 3 cm. lata, apice rotundata, margine deorsum grosse dentata vel denticulata, sursum subintegra, sessilia basi auriculato-cordata, folia superiora minora oblonga 3 cm. longa 1 cm. lata basi sessilia auriculata apice obtusa vel acutiuscula folia omnia crassiuscula, margine irregulariter denticulata, utraque pagine tenuissime pilosa, pilis brevissimis simplicibus furcatis vel stellatis. Racemi ad apicem ramorum terminales, flores non visi. Siliqua linearis, recta, suberecta,  $3\frac{1}{2}$  cm. longa 2 mm. lata, complanata utrinque obtusa, facie medio 1-costata, nervosa. Semina valde complanata, rotundata,  $1\frac{1}{5}$  mm. in diametro.

HAB. Insul. Kelung, leg. S. SASAKI, 1910, Mai.

***Arabis lithophila* HAYATA** sp. nov. Herba annua? pilosiuscula; caulis 30 cm. longus, sub-simplex. Folia radicalia obovato-spathulata, 10 cm. longa  $3\frac{1}{2}$  cm. lata apice rotundata, a medio deorsum attenuata, ad basin 1 cm. lata, margine subintegra, crassiuscula, utraque tenuissime pilosa, pilis brevissimis simplicibus furcatis vel stellatis, folia caulina minora oblongo-lanceolata basi auriculata margine denticulata. Racemi terminales. Sepala obovata oblonga, 3 mm. longa,  $1\frac{1}{2}$  mm. lata, apice obtusa, 5-nervia. Petala obovato-cuneata 5 mm. longa prope apicem 2 mm. lata apice rotundata deorsum cuneata ad basin subunguiculata. Stamina 6, 4 mm. longa, antheris oblongo-linearibus apice apiculatis. Stigma subsessile integrum vel tenuissime

2-lobatum. Siliqua linearis erecta, recta, 5 cm. longa, 2 mm. lata, facie medium tenuiter costata, nervosa.

HAB. Fukkikaku, leg. S. SASAKI, Aprili. 1910.

*Cardamine* LINN.

***Cardamine agyokumontana* HAYATA sp. nov.** (Fig. 6). Herba tenuissima perennis, rhizoma erectum tuberiferum in speciminibus nostris 1 cm.

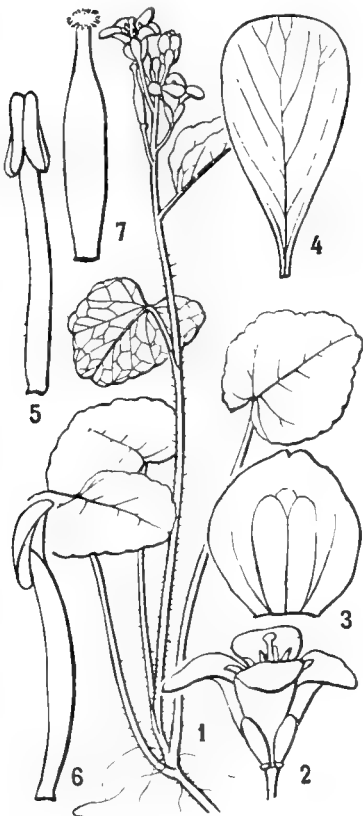


Fig. 6.

*Cardamine agyokumontana* HAYATA. 1, the plant; 2, a flower, 3, a sepal; 4, a petal; 5, 6, stamens; 7, an ovary. Fig. 1, natural size; fig. 2-7, more or less magnified.

longum radices filiformes rubras numerosas emittens, caulis pilosiusculus simplex. Folia radicalia longe petiolata, glabra, cordato-reniformia 2 cm. lata  $1\frac{1}{2}$  cm. longa, membranacea apicem rotundata basi reniformia ad extremitatem acuta ad petiolum abeuntia, margine crenulata, ad sinus crenarum breve mucronata, 5-7-nervia, nervis subrectis ad sinus crenarum attingentibus, petiolis 4 cm. longis glabris. Folia caulina 1-2. Racemi breves 1 cm. longi, terminales, pedicellis 5 mm. longis. Sepala oblonga, utrinque obtusissima, 3 mm. longa  $1\frac{1}{2}$  mm. lata, glabra. Petala obovato-spathulata  $7\frac{1}{2}$  mm. longa 4 mm. lata, apice rotundata, a medio deorsum subito cuneata ad unguem abeuntia, basi unguiculata. Stamina 6,  $4\frac{1}{2}$  mm. longa, filamentis complanatis, antheris oblongo-linearibus 1 mm. longis apice obtusis basi 2-lobatis. Ovarium erectum lineare  $4\frac{1}{2}$  mm. longum  $\frac{1}{2}$  mm. latum. Siliqua non visa.

HAB. Mt. Agyoku, 4000 ped. alt., leg. S. KATŌ, Juni. 1909.

Near *Cardamine circæoides* HOOK

f. et THOMS. (in Fl. Brit. Ind. I. p. 137); but differs from it by the far much smaller form.

**Cardamine arisanensis** HAYATA sp. nov. (Fig. 7). Perennis; caulis 30-40 cm. longus, glaber, sulcatus, superiore subramosus. Folia radicalia lyrata, longe petiolata, cum petiolis 10-15 cm. longa, in ambitu spathulata, apice rotundata, basi gradatim angusta, segmentis utroque latere 11-12 obovatis subpetiolulatis, segmento terminali obovato subtrilobato maximo minus 1 cm. longo, segmentis inferioribus gradatim minoribus linearibus  $\frac{1}{2}$  cm. longis a se  $\frac{1}{2}$  cm. distantibus glabris, petiolis circ. 7 cm. longis lamina

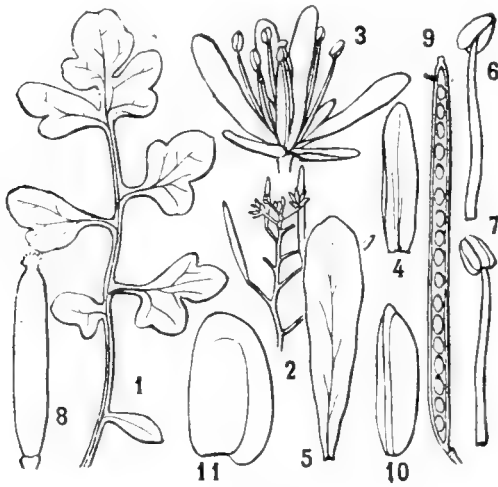


Fig. 7.

*Cardamine arisanensis* HAYATA. 1, a leaf; 2, inflorescence; 3, a flower; 4, a sepal; 5, a petal; 6, 7, stamens; 8, an ovary; 9, a pod; 10, 11, a seed, seen from different sides. Fig. 1-2, natural size; 3-11, more or less magnified.

longa, filamentis complanatis, glandulis interstaminibus brevibus dentiformibus  $\frac{1}{10}$  mm. longis. Ovarium lineare  $2\frac{1}{2}$  mm. longum leviter hirsutum. Siliqua erecta, linearis complanata  $2\frac{1}{2}$  cm. longa, minus 1 mm. lata apice angustata truncata basi subaequilata vel plus minus contracta, valvis submembranaceis.

HAB. In Monte Morrison, ad 10000-11000 ped. alt., leg. T. KAWAKAMI et U. MORI, 1906, Oct. (No. 2252); in Montibus Centralibus, Feb. 1908.

longioribus vel brevioribus. Folia caulina iis radicalibus breviora, 5 cm. longa segmentis minoribus paucioribus. Racemi terminales dense florati, pedicellis 2-3 mm. longis leviter pubescentibus, floribus 3 mm. longis. Sepala 4, linearia  $2\frac{1}{2}$  mm. longa  $\frac{2}{3}$  mm. lata dorso hirsuta leviter carinata. Petala 4, spathulata, sursum latiora 3 mm. longa 1 mm. lata, apice rotundata vel obtusa, ad basin gradatim attenuata, glabra, (alba?). Stamina 6,  $2\frac{1}{2}$  mm.

*Eutrema* BR.

**Eutrema hederæfolia** F. et S. Enum. Pl. Jap. II. p. 283.

*Wasabia tenuis* MATSUM. Ind. Pl. Jap. II.-2, p. 161.

HAB. Kelung, leg. T. YUBASHI, Juli., 23, 1910.

Compared with a Japanese specimen in the Tōkyō Herbarium.

DISTRIB. Japan.

## Capparideæ.

*Capparis* LINN.

**Capparis Henryi** MATSUM. in MATSUM. et HAYATA Enum. Pl. Formos. p. 26, t. III.

DESCRIPTIO AUCTATA: Fructus oblongo-globosus 23 mm. longus 18 mm. latus, facie rugosus impresso-reticulato-punctatus tenuissime impresso 7-sulcatus, carpellis incrassatis lignosis flavescentibus; stipitibus fructus 2 cm. longis validissimis rectis, pedicellis 1 cm. longis descendito-recurvis. Semina numerosa, subcomplanata, subrotundata, 3 mm. lata, totiusque longa, basi profunde cordata, medio impressa, testa castaneo-rubescenti levi subnitida.

HAB. Kōshūn: Kuraru, leg. B. HAYATA, Aug. 1913.

**Capparis Kikuchii** HAYATA sp. nov. Rami glabri, minute striati, subrecti, læves. Folia alterna, oblonga, vel lanceolata, plus minus obliqua, in exsiccatō coriaceo-membranacea vel membranacea, 8-9 cm. longa 3-4 cm. lata, utrinque acuta, vel apice breve cuspidato-acuta, ad summum obtusa, utraque glabra, margine integra costis supra medio sulcatis subtus elevatis, venis et venulis utraque pagine elevatis reticulatis, petiolis 1 cm. longis. Flores semper geminatim ad axillas foliorum siti, pedicellis 1-2 cm. longis petiolo longioribus erectis. Sepala 4, extus glabra, intus tenuiter pubescentia, alia 2 latiora 7 mm. longa 4 mm. lata valde concava, alia 2 angustiora. Petala 4 lanceolata, utrinque obtusa utraque pagine tomentosa, 12 mm. longa, 4 mm. lata, basi cuneata. Stamina ∞, 3 cm. longa, antheris oblongo-linearibus 1½ mm. longis. Ovarium longe stipitatum, (stipitibus 2½ cm. longis filiformi-

bus), ovoideum  $1\frac{1}{2}$  mm. longum apice acutum, glandula una ad receptaculum antice sita.

HAB. Tōkō, leg. Y. KIKUCHI, 1913, Juni.

**Capparis leptophylla** HAYATA sp. nov. Frutex. Rami teretes subrecti, tenuissime pubescentes, brevissime remoteque spinosi, spinis recurvis  $1\frac{1}{2}$  mm. longis apice acutis basi dilatatis. Folia alterna membranacea, lanceolata 10 cm. longa 3 cm. lata, apice acuminata ad summum obtusa, basi obtusa, margine subintegra, costis supra impressis vel tenuiter sulcatis subtus elevatis, venis et venulis utraque elevatis reticulatis, venis primariis lateralibus numerosis utroque latere costæ 10–20, utraque pagine glabra, petiolis 5 mm. longis supra tenuiter sulcatis, spinis utroque latere basis petiolorum dispositis. Flores solitarii, supra-axillares, a axilla foliorum 3 mm. remoti, pedicellis 6 mm. longis erectis tenuissime pubescentibus. Sepala 4, oblonga valde concava, 8 mm. longa in explicatio 5 mm. lata, glabra vel ad apicem leviter pubescentia. Petala 4, obovata oblongo-rectangularia, 10 cm. longa  $4\frac{1}{2}$  mm. lata, apice rotundata basi angustata, intus glabra, extus pubescentia. Stamina  $\infty$  numerosae filamentis 18 mm. longis, antheris oblongo-linearibus 2 mm. longis utrinque, obtusis. Ovarium longe stipitatum, (stipite 3 mm. longo), ovoideo-conicum 2 mm. longum, 1 mm. latum apice acutum. Fructus ignotus.

HAB. Akō: Mankinshō, leg. S. SASAKI, Mart. 1910.

Near *C. membranacea* but differs from it by the much thinner leaves and shorter prickles.

**Capparis oligostema** HAYATA sp. nov. Frutex scandens? Rami glabri subrecti vel subflexuosi, inermi, cortice lævi flavo-fuscenti longitudinaliter rugoso. Folia oblongo-ovata vel oblongo-obovata,  $5\frac{1}{2}$  cm. longa  $3\frac{1}{2}$  cm. lata, apice obtusa ad summum obscure mucronata vel obtusa, basi obtusa vel rotundata, crassiuscula exsiccato coriacea viridiscientia, utraque glabra secundum costam tenuiter plicata, costa supra plana vel sulcata subtus elevata, venis lateralibus tenuissimis supra  $\pm$  elevatis subtus non conspicuis, margine integerrima leviter desuper recurva, petiolis brevioribus  $1-1\frac{1}{2}$  cm. longis intus sulcatis. Flores parvi umbellato-paniculati, paniculis terminalibus



vel axillaribus 5 cm. longis. Sepala 4? oblongo-rotundata. Petala 4? oblonga. Stamina 8, anthera oblongo-linearis apice apiculata. Ovarium stipitatum. Fructus baccatus longe pedicellatus et stipitatus, globoso-ovoideus verrucosus, cum stipitibus 3 cm. longus 12 mm. latus apice truncatus basi subito attenuatus ad stipitem 6-7 mm. longum abeuns, generaliter 2-spermus.

HAB. Kōshūn, Kurari, Mai. 30, 1912, leg. B. HAYATA, (Fl.); leg. S. KUSANO, Jan. 1909, (Fr.).

Remarkable for the smallness of flowers and the paucity of stamens which are as few as eight in one flower.

**Capparis tenuifolia** HAYATA sp. nov. Rami subglabri, minute striati, subrecti. Folia crassiuscula, in exsiccatō membranacea, tenuissima, alterna, ovata vel ovato-oblonga, 7 cm. longa, 3 cm. lata, apice acuta ad summum obtusa, basi obtusa, venis venulisque tenuissimis, utraque glabra, margine integra. Flores geminatim superpositi, axillares, pedicellis 17 mm. longis erectis. Sepala 4, alia 2 majora valde concava 5 mm. longa 3 mm. lata utrinque glabra, alia 2 minora, apice pubescentia. Petala 4, obovato-oblonga, 6 mm. longa, 3 mm. lata, apice rotundata, basi acuta, intus glabra, extus pubescentia. Stamina ∞, antheris oblongo-linearibus 1½ mm. longis. Ovarium longe stipitatum, (stipite 2 cm. longo), ovoideo-conicum 1 mm. longum, apice acutum.

HAB. Akō: Tōkō, leg. U. MORI, Aprili. 1907, (No. 2930).

## Violaceæ.

### *Viola* LINN.

**Viola adenothrix** HAYATA sp. nov. (Fig. 9.) Rhizoma ascendens ad apicem folia radicalia scapos et stolonē emittens, stolonibus procumbentibus ad nodos radicanibus. Folia radicalia hirsuta longe petiolata, lamina oblongo-cordata, apice acuta margine serrulato-crenata, basi leviter cordata, 2½ cm. longa 18 mm. lata, supra parce hirsuta, subtus ad venas dense hirsuta, petiolis 4 cm. longis dense hirsutis, pilis patentibus, stipulis cuspidato-ovatis

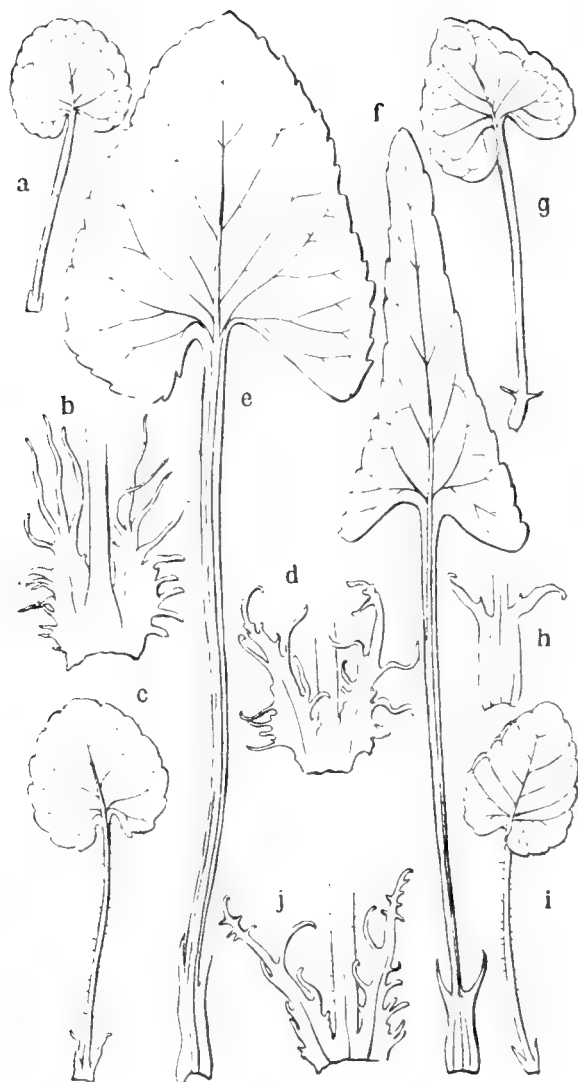


Fig. 8.

*Viola* spp., leaves and stipules.

a, b = *Viola formosana* HAYATA;  
 e = *Viola japonica* LANGSD.;  
 g, h = *Viola verecunda* A. GRAY;

c, d = *Viola Nagasawai* HAYATA;  
 f = *Viola Patrinii* DC.;  
 i, j = *Viola diffusa* DING.

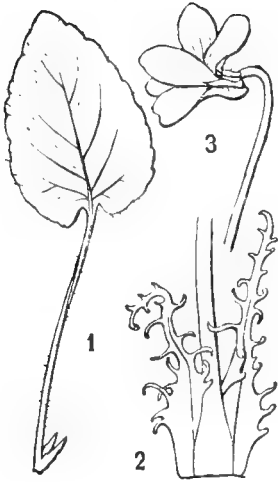


Fig. 9.

*Viola adenothele* HAYATA. 1, a leaf; 2, stipules; 3, a flower. Fig. 1 and 3, natural size; fig. 2, magnified.

supra basin glanduloso-hirsuta, pilis apice clavatis, inferius 7 mm. longum  $3\frac{1}{2}$  mm. latum apice truncato-emarginatum basi calcaratum (calcar brevissimo  $1\frac{1}{2}$  mm. longo 2 mm. lato). Stigma terminale cupuliforme.

HAB. Arisan: Bandaisan, leg. B. HAYATA et S. SASAKI, Jan. 1912.

Near *V. brachycentra*, but differs from it in having runners and in the position of bracts.

***Viola brachycentra* HAYATA** sp. nov. (Fig 10.) Rhizoma ascendens squamosum, ad apicem folia radicalia et scapos gerens.

obliquis basi ovatis apice cuspidiformibus margine fimbriatis 8 mm. longis 3 mm. latis extus hirsutis, stipulis foliorum stolonis angustioribus margine dentato-ciliolatis. Scapi 5-7 cm. longi, sursum bracteis 2 instructi, bracteis linearibus 6 mm. longis  $\frac{2}{3}$  mm. latis margine ciliatis dorso hirsutis intus glabris. Sepala oblonga, inæqualia  $4\frac{1}{2}$  mm. longa,  $1\frac{1}{2}$  mm. lata, hirsuta. Petala inæqualia, superiora obovato-cuneata 8 mm. longa, 4 mm. lata apice rotundata, basi cuneata, lateralia oblique oblongo-rectangularia 8 mm. longa  $3\frac{1}{2}$  mm. lata apice truncata basi obtusa

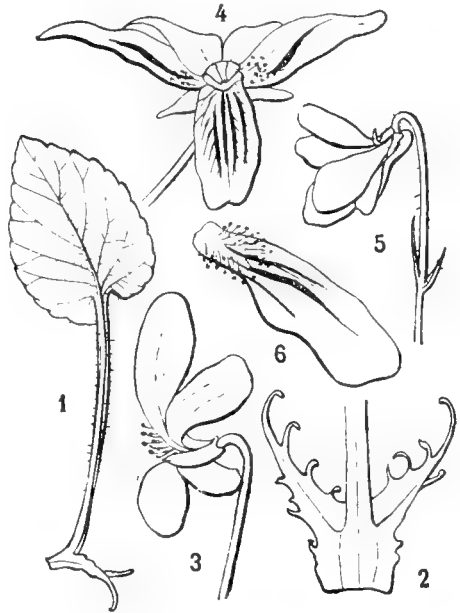


Fig. 10.

*Viola brachycentra* HAYATA. 1, a leaf; 2, stipules; 3, a flower seen from side; 4, the same, seen from front; 5, another flower seen from side; 6, a wing. 1 and 5 natural size; 2, 3, 4 and 6, more or less magnified.

Folia omnia radicalia longe petiolata hirsuta, lamina cordata vel oblongo-cordata 2-3 cm. longa, 23 mm. lata, membranacea, utraque pagine parce pubescenti, subtus ad venas pubescenti, (margine crenulata ad sinus obscure mucronata), apice acuta, obtusa, basi profunde cordata, petiolis 5 cm. longis hirsutis basi utrinque stipulis instructis, stipulis oblique ovatis 8 mm. longis, basi petioli adnatis margine fimbriatis 1-costatis. Scapi 5-10 cm. longi, parcissime hirsuti, infra medium bracteis 2 instructi, bracteis linearibus 7 mm. longis basi dilatatis. Sepala leviter inæqualia, lanceolato-ovata, extus hirsuta, intus glabra, ultra basin producta. Petala inæqualia, 2 superiora obovata apice rotundata basi acuminata 13 mm. longa  $7\frac{1}{2}$  mm. lata, lateralia obliqua obovato-rectangularia 13 mm. longa 6 mm. lata apice rotundata basi subunguiculata versus basin intus glanduloso-hirsuta (pilis apice globuliferis), inferius brevissimum 10 mm. longum 4 mm. latum rectangulare apice truncatum oblique emarginatum basi brevissime calcaratum (calcarei 2 mm. longo totiusque lato) cœruleum, alba albicantia.

HAB. Arisan : Taroyen, leg. B. HAYATA et S. SASAKI, Jan. 20, 1912.

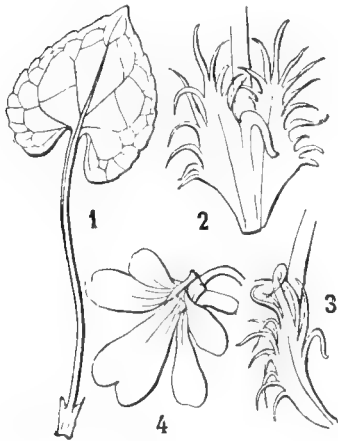


Fig. 11.

*Viola hypoleuca* HAYATA. 1, a leaf; 2, stipules seen from back; 3, the same, seen from side; 4, a flower. Fig. 1 and 4, natural size, fig. 2 and 3, magnified.

***Viola hypoleuca* HAYATA sp. nov.**

(Fig. 11.) Rhizoma erecto-ascendens. Folia omnia radicalia vel rarius caulina, longe petiolata, lamina cordata apice obtusa vel acuta basi auriculato-cordata vel cordata 3 cm. longa  $2\frac{1}{2}$  cm. lata, (sinui basilari 4 mm. lato), ab insertione petioli usque ad lobos basilares 1 cm. longa, margine denticulato-crenulata supra prope sinus fasciculis pilorum instructa, cæterum glabra, subtus omnino glabra pallido-albicanti crassiuscula, venis supra elevatis subtus planis distinctis, petiolis 9 cm. longis glabris, stipulis rubescentibus ovatis vel linearibus basi petiolorum adnatis 4 mm. longis margine valde fimbriatis. Scapi 10-15 cm. longi, basi squamis

fimbriatis 1-2 instructi, versus apicem 2-bracteis instructi, bracteis linearibus 5 mm. longis basi parcesissime fimbriatis vel subintegris. Sepala inæqualia linearia 6 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusa basi truncata, ultra basin producta. Petala inæqualia, superiora brevissima obovato-oblonga apice truncato-rotundata basi cuneata 10 mm. longa  $4\frac{1}{2}$  mm. lata prope basin oblique reflexa, lateralia oblongo-cuneata 15 mm. longa 6 mm. lata apice truncato-emarginata basi cuneata, inferius longissimum obovato-cuneatum 18 mm.

longum versus apicem latissimum 1 cm. latum apice rotundatum, profunde emarginatum vel leviter 2-lobatum, basi cuneatum, calcaratum, (calcar 6 mm. longo 2 mm. lato recto vel leviter recurvato).

HAB. Tonkurankei, leg. U. MORI, 1910, Aprili.

Near *V. formosana* HAYATA, but differs from it in having leaves with obtuse apex.

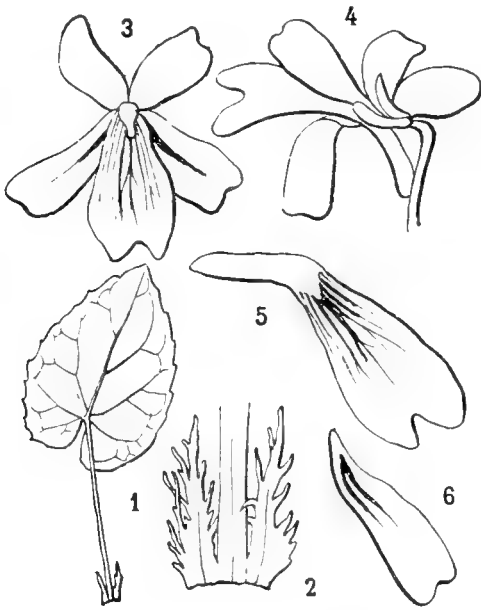


Fig. 12.

*Viola Kawakamii* HAYATA. 1, a leaf; 2, stipules; 3, a flower, seen from front; 4, the same, seen from side; 5, a lip; 6, a wing. 1, natural size, others more or less magnified.

### ***Viola Kawakamii***

HAYATA (Fig. 12). Ic. Pl. Formos. I. p. 58.

HAB. Inter Funkiko et Taroyen, Jan. 20, 1912, leg. B. HAYATA et S. SASAKI.

### ***Viola Kawakamii* HAYATA var. *stenopetala* HAYATA n. v. (Fig. 13).**

Petala lineari-cuneata, superiora lineari-cuneata 10 mm. longa 3 mm. lata apice subtruncata basi cuneato-attenuata; lateralia 13 mm. longa  $3\frac{1}{2}$  mm. lata, inferius cum calcar 23 mm. longum lineari-cuneatum 5 mm. latum apice 2-lobatum

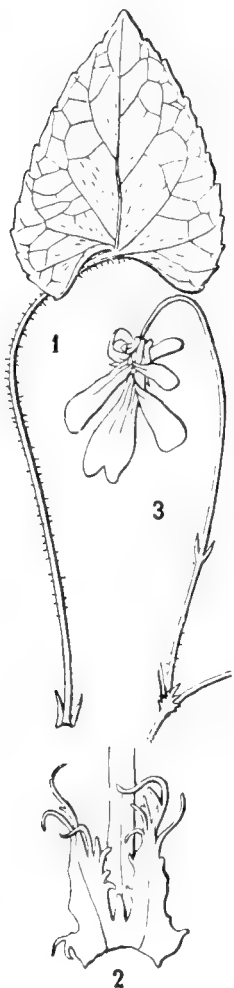


Fig. 13.

*Viola Kawakamii* HAYATA var. *stenopetala* HAYATA. 1, a leaf; 2, stipules; 3, a flower. Fig. 1 and 3, natural size, fig. 2, magnified.

inferius lineari-oblongum 7 mm. longum  $2\frac{1}{2}$  mm. latum apice rotundatum basi calcaratum, calcar 3 mm. longo 2 mm. lato recto. Stigma terminale botrioidum.

basi cuneato-attenuatum calcaratum, calcar 6 mm. longo  $1\frac{1}{2}$  mm. lato subrecto.

HAB. Arisan : leg. B. HAYATA et S. SASAKI Jan. 1912.

Differs from the type by the much narrower petals.

***Viola kosanensis* HAYATA sp. nov.** Rhizoma ascendens squamosum, ad apicem folia radicalia et scapum gerens. Folia omnia radicalia, longe petiolata, lamina ovato-cordata apice acuta vel obtusa, basi profunde cordata,  $2\frac{1}{2}$  cm. longa totiusque lata, margine crenata, supra parcesime hirsuta vel subglabra, subtus pallidissima glaberrima, petiolis glabris 5 cm. longis, stipulis linearibus apice acuminatis basi plus minus latioribus longe fimbriatis 1 cm. longis basi  $1\frac{1}{2}$  mm. latis. Scapi 6–8 cm. longi, versus apicem bracteis 2 suboppositim instructi, bracteis linearibus 5 mm. longis basi  $\pm$  latioribus  $\frac{1}{2}$  mm. latis basi dentibus filiformibus 1–3 instructis. Sepala lanceolata inaequalia apice obtusa basi truncata ultra insertionem producta 5–6 mm. longa. Petala inaequalia superiora 2 obovato-oblonga apice rotundata basi subunguiculata supra basin valde reflexa 9 mm. longa 3 mm. lata, lateralia longiora semi-oblonga, vel semi-ovato-oblonga 11 mm. longa 3 mm. lata apice obtusa vel obtuso-rotundata basi attenuata,

HAB. Fökien : Kosan, leg. S. NAGASAWA, 1910, Aprili.

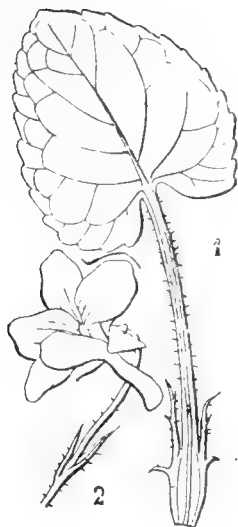


Fig. 14.

*Viola longistipulata* HAYATA.  
1, a leaf; 2, a flower. All  
figures, natural size.

***Viola longistipulata* HAYATA** sp. nov. (Fig. 14.) Folia fere omnia radicalia longe petiolata rotundato-cordata 3 cm. longa totiusque lata apice obtusa basi cordata margine obtuso-serrulata utraque pagine hirsuta, petiolis 5 cm. longis parce hirsutis, stipulis basi petiolum adnatis lineari-lanceolatis 16 mm. longis apice acuminatis basi latere interiore cum petiolis connatis margine breve remoteque fimbriato-ciliatis. Scapi 5-7 cm. longi hirsuti supra medium bracteis oppositis 2 instructi, bracteis linearibus 1 cm. longis 1 mm. latis. Sepala ovata inæqualia, 8 mm. longa,  $3\frac{1}{2}$  mm. lata, dorso et margine ciliolata. Petala superiora et lateralia subæqualia obovata, 13 mm. longa, 7 mm. lata, apice rotundata, basi cuneata, inferius cum calcaribus 2 cm. longum obovatum 6 mm. latum basi calcaratum, calcaribus 7 mm. longo  $2\frac{1}{2}$  mm. lato subrecto sensim superiore recurvato.

HAB. Formosa: loco non indicato.

***Viola thrichopoda* HAYATA** sp. nov. (Fig. 15.) Folia omnia radicalia breviuscule petiolata, lamina late-ovata apice obtusa basi leviter cordata 19 mm. longa 13 mm. lata margine crenulato-denticulata, utraque pagine subglabra, margine ciliata, petiolis lamina brevioribus sæpe dimidium laminæ



Fig. 15.

*Viola thrichopoda* HAYATA. 1, a leaf; 2, stipules; 3, a flower. Fig. 1 and 3, natural size, fig. 2, magnified.

æquantibus patento-hirsutis basi dilatatis, stipulis lineari-lanceolatis 1 cm. longis basi dilatatis basi petioli adnatis margine ciliolato-fimbriatis apice linearibus. Scapi 5 cm. longi, a medio deorsum hirsuti, sursum glabri, medio bracteis 2 suboppositis instructi, bracteis linearibus 7 mm. longis. Sepala

lanceolato-linearia 6 mm. longa  $1\frac{1}{2}$  mm. lata margine ciliolata. Petala 2-superiora obovata basi cuneata 1 cm. longa, lateralia oblique obovato-oblonga  $1\frac{1}{2}$  cm. longa  $6\frac{1}{2}$  mm. lata apice rotundata basi oblique cuneata prope basin glanduloso-hirsuta (pilis clavatis), inferius cum calcaribus 13 mm. longum  $4\frac{1}{2}$  mm. latum oblongum apice emarginatum ad centrum brevissime mucronatum basi calcaratum, calcaribus 3 mm. longo totiusque lato.

HAB. Chiakankei, ad 6000 ped. alt., leg. U. MORI, Jan. 1908.

Near *V. sylvestris* KIT., but differs from it by the ciliate petioles.

## Bixineæ.

### *Casearia* JACQ.

**Casearia Merrilli** HAYATA sp. nov. (Tab. III.) Frutex. Rami recti vel flexuosi, glabri. Folia disticha alterna, oblonga, elliptica, 15 cm. longa  $5\frac{1}{2}$  cm. lata, apice breve acuminata vel acuta ad summum obtusa, basi oblique truncata rotundata vel acuta chartacea pellucido-punctata, margine obtusa obscure denticulata, dentibus 4 mm. latis  $1\frac{1}{2}$  mm. longis, costa supra sulcata vel plana subtus elevata, venis lateralibus utraque tenuiter elevatis, supra et subtus ad costas et prope costas tenuiter hirsuta, cæterum glabra, venis lateralibus primariis utroque latere costæ 10-13. Flores ad axillas dense 20-30 clustati, pedicellis 10-5 mm. longis hirsutis basi articulatis bracteatis, bracteis rotundatis vel angulatis planis vel concavis hirsutis ciliatis 1 mm. longis. Sepala 5 basi connata imbricata, oblongo-rotundata, extus hirsuta intus glabra, margine ciliata, 2-3 mm. longa. Petala 0. Stamina 8, basi calycis affixa, filamentis incrassatis hirsutis, antheris oblongo-ovatis basi cordatis apice emarginatis. Staminodia 8, cum staminibus alterna incrassata claviformia hirsuta cum filamentis æquilongis. Ovarium cylindrico-conicum glabrum uni-loculare 4-ovulatum, placentis parietalibus 2, ovulis erectis, micropylæ superiore, stylo brevissimo, stigmate leviter 2-3-lobato. Bacca ellipsoidea; pericarpium carnosum facie botrioideo-punctatum.

HAB. Kōshūn: Kuraru, (Fl.); Holisha, leg. R. KANAHIRA, Mart. 1912, (Fr.); Uraisha, Mart. 1910, S. KATŌ, (Fr.).



This new species is named after Mr. E. D. MERRILL, who courteously compared it with all the species of the genus of the Philippines and suggested me that it may be a plant not yet described.

## Pittosporæ.

### *Pittosporum* BANKS.

***Pittosporum oligospermum* HAYATA** sp. nov. Frutex? Rami graciles glabri, apice quasi-verticillatim foliati. Folia tenuiter coriacea, obovato-oblonga, 8 cm. longa 27 mm. lata, apice cuspidato-acuminata, basi cuneata, utraque glabra, margine undulata, supra nitida, subtus pallidissima, costis et venis supra planis inconspicuis, venulis minute impresso-reticulatis, subtus costis elevatis, venis et venulis inconspicuis, petiolis 5 mm. longis supra sulcatis. Flores ignoti. Fructus ad apicem ramorum 3-4-fasciculati, longe pedicellati, pedicellis gracilibus 3 cm. longis. Capsula globosa, valvis 3 oblongis utrinque acutis 1 cm. longis crassiusculis lignosis. Semina pauca angulato-oblonga, 4 mm. longa, angulata, rubescentia.

HAB. Formosa: loco non indicato.

Near *P. glabratum*, but differs from it by the much smaller fruits; and from *P. pauciflorum* by the much more acuminate leaves.

***Pittosporum parvifolium* HAYATA** sp. nov. Frutex. Rami ramosissimi, dense foliati. Folia obovata vel cuneato-obovata, subsessilia, 3-4 cm. longa 1½-2 cm. lata, apice obtusa, rotundata, rarius leviter emarginata, basi attenuata vel cuneato-attenuata, utraque glabra, costis supra impressis, subtus elevatis venis et venulis supra impressis distincte reticulatis, subtus non distinctis, coriacea margine desuper leviter recurva, integra vel ± undulata, petiolis brevissimis 2 mm. longis. Flores ignoti. Capsula obovata 3-gona, 14 mm. longa, 12 mm. lata, apice cum stylo apiculata, basi obtusa, 3-valvata, valvis una majora, altris minoribus crassis ligunosis. Semina 20-40, depresso-complanato-globosa, 2-3 mm. longa, nigro-rubrescentia.

HAB. Bonin: Chichijima, leg. H. HATTORI. Juli. 1905.

**Pittosporum viburnifolium** HAYATA sp. nov. Rami validiusculi, cortice cinerascenti. Folia crassiuscula, oblongo-obovata, 12 cm. longa,  $5\frac{1}{2}$  cm. lata, apice rotundata vel obtusa, basi cuneata, utraque glabra, subtus pallida, costis et venis supra impressis subtus valde elevatis venis primariis arcuatis, utroque latere costæ 6, margine integerrima leviter recurvata. Flores ignoti. Fructus in paniculam terminalem 10 cm. longam 8 cm. latam laxè dispositi, pedicellis  $1\frac{1}{2}$  cm. longis capsula æquilongis. Capsula subglobosa, 2-valvata, valvis late rotundatis 2 cm. longis  $2\frac{1}{2}$  cm. latis, crassiusculis coriaceo-lignosis. Semina rubescentia oblonga vel semi-oblonga 7 mm. longa, apice  $\pm$  recurvata.

HAB. Kôtôshô : leg. S. SASAKI, Juni. 1911.

## Polygalææ.

### *Salomonina* LOUR.

**Salomonina stricta** S. et Z. ; MATSUM. Ind. Pl. Jap. II.-2, p. 299.

HAB. Tôyen : Daigyorinsho leg. T. INOUE, Sept. 1908.

Compared with a Japanese specimen in the Tôkyô Herbarium.

DISTRIB. Japan.

### *Polygala* LINN.

**Polygala crassiuscula** HAYATA sp. nov. Suffrutescens glabra, 20 cm. alta, sæpe simplex, rarius paucissime ramosa. Folia lanceolata, alterna, crassiuscula, in exsiccatò membranacea, 6 cm. longa, 17 mm. lata, apice acuta vel acuminata ad summum tenuiter aristata, basi obtusa, margine integra sed versus apicem minute aristato-ciliolata, subtus pallidissima, venis lateralibus utroque latere 3-4 arcuatis apice eam superiorem proximam attingentibus, petiolis 12 mm. longis. Flores purpurei? racemosi, racemis terminalibus 5 cm. longis dense floratis, bracteis lanceolatis  $1\frac{1}{2}$ -2 mm. longis, pedicellis 2-3 mm. longis desuper recurvis apice dilatatis. Sepala 5, exteriora 3, interiora 2, decidua; supremum exteriorum sepalorum globosum saccatum majusculum rotundatum 3 mm. longum; 2 inferiora exteriorum sepalorum late rotundata basi oblique leviter cordata  $1\frac{1}{2}$  mm. longa; 2 interiora petaloidea oblique obovata  $7\frac{1}{2}$  mm.

longa 4 mm. lata apice rotundata, basi cuneata valde concava. Petala alte coalita, lateralibus arete imbricata 8 mm. longa 2 mm. lata apice rotundata, medio plicato-reflexa basi oblique rotundata, carina latere interiore connata apice cristam  $1\frac{1}{2}$  mm. longam digitiformem gerens, digitis incrassatis. Ovarium glabrum breviter stipitatum (disco late annulari) rotundatum obcordatum 2 mm. latum valde complanatum, margine subalatum. Stigma inæquale superne breve dentiforme apice punctiforme inferne subdilatatum concavum acutum. Stylus apice dilatus, infra stigma appendiculatus. Capsula ignota.

HAB. Montibus centralibus: Arisan, leg. S. SASAKI, Jan. 1911.

Near *P. arcuata* HAYATA and *P. nimborum* DUNN (in Fl. Kwangt. and Hongk. p. 39); but differs from the former by the larger light purple flowers and smaller leaves, and from the latter by the smaller leaves with very much fewer lateral veins.

***Polygala stenophylla* HAYATA sp. nov.** Suffrutescens. Caulis erectus rectus, simplex eramosus, toto longitudine foliatus, 30–40 cm. longus, gracillimus, teres, 1 mm. in diametro sectionis, flavescens, glaber. Folia alterna, subsessilia, lanceolata linearia vel lineari-lanceolata, 3 cm. longa, 3 mm. lata, apice acuta vel obtusa, basi obtusa, suberecta utrinque glabra, membranacea, supra tenuissime reticulata, subtus pallida, petiolis brevibus 1 mm. longis vel brevioribus. Racemi simplices terminales 5–6 cm. longi, laxe florati, pedicellis 2–3 mm. longis basi 2-bracteatis, bracteis minutis ovatis 1 mm. longis. Sepala exteriora 3, subæqualia oblonga,  $2\frac{1}{2}$  mm. longa, valde concava, interiora obovata 5 mm. longa, 3 mm. lata, apice rotundata, basi subito cuneata obliqua  $\pm$  concava. Petala lateralibus ascendentibus, oblonga 5 mm. longa,  $1\frac{1}{2}$  mm. lata, a medio  $\infty$ -forme contracta, basi cum carina coalita, supra basin libera, intus deorsum hirsuta, apice obscure 2–3-lobulata obliqua, carina sublibera basi unguiculata cum cristam 7 mm. longa  $2\frac{1}{2}$  mm. lata complete latere interiore connata, unguis  $2\frac{1}{3}$  mm. longis, laminis basi superne auriculatis, cristis 5-fidis, segmentis alte multi-fimbriatis. Stamina 8, vagina staminum lata, explicatio  $1\frac{1}{2}$  mm. lata  $3\frac{1}{2}$  mm. longa. Ovarium breve stipitatum obcordatum, stigmata inæqualia, superius sessile, inferius late stipitatum, stipite complanato  $\frac{2}{3}$  mm. longo, utrumque pectinatum.

HAB. Fōkien: Kosan, leg. S. NAGASAWA, Aprili. 1910, (No. 226).

Near *P. hongkongensis* HEMSL. (Ind. Fl. Sin. I. p. 60, Pl. II.), but differs from it by the much narrower leaves and 2 distinctly lobed stigma; also near *P. tenuifolia*, but distinguishable from it in having broader leaves and terminal racemes.

## Caryophyllæ.

### *Dianthus* LINN.

***Dianthus pygmæus*** HAYATA sp. nov. Herba nana 6-7 cm. alta, rhizomatibus gracilibus pauci-ramosis; caulis simplex, erectus, rectus. Folia radicalia ad basin caulis approximativè dense disposita, linearia 23 mm. longa 1½ mm. lata, apice acuta, basi longè attenuata in basi dilatata caulem semiamplectantia, margine tenuissime marginata, et sub lente minute denticulata, sessilia. Folia caulina radicali similia, decussatim 3-seriatim remote sita, superioribus minoribus. Flores sub-sessiles erecti, basi bracteis oppositis 2-seriatis decussatis instructi, bracteis inferioribus ovatis apice longè cuspidatis 1 cm. longis 3½ mm. latis basi æquilatis margine hyalinis, superioribus oblongis apice breviorè cuspidatis basi obtusis 12 mm. longis 5 mm. latis margine hyalinis. Calyx cylindricus, 18 mm. longus 3½ mm. latus, multi-striatus, ore 5-labatus, lobis triangulari-ovatis 4 mm. longis 2½ mm. latis leviter patentibus extus glabris intus pubescentibus margine breviter ciliolatis apice obtusis. Petala 5, longè unguiculata cum ungue 3 cm. longa, unguibus linearibus 17 mm. longis 1 mm. latis, lamina rotundato-obovata 13 mm. longa 12 mm. lata patento-reflexa a medio sursum alte fimbriata, (fimbriis sæpe simplicibus, nunquam furcatis, 8 mm. longis basi ½ mm. latis omnino 10, radiatim divergentibus), basi cuneata integra. Stamina 10 basi in tubum brevem 1 mm. longum connata, supra basin libera, filamentis altris 6 mm. longis altris 4 mm. longis, antheris lineari-oblongis 1 mm. longis ½ mm. latis apice arete 2-lobatis basi sagittatis. Capsula (submatura) stipitata, stipite 1 mm. longo cum tubo staminum æquilongo, cylindræa 8 mm. longa 2½ mm. lata supra medium latissima glabra apice obtusa, cum stylo articulata, stylis 2, distinctis 9 mm. longis, linearibus intus hirtellis. Semina minuta.

HAB. In monte Morrison, ad 13000 ped. alt., leg. T. KAWAKAMI et U. MORI, 1908, Oct. (No. 2259).

Near *D. superbus* LINN., but differs from it in having much shorter calyx-tube and less fimbriate petals.

*Silene* LINN.

**Silene Morii** HAYATA sp. nov. Caulis plus 70 cm. altus, tetragonus facie leviter sulcatus hirsutus, ad nodos leviter prominulus. Folia lanceolata 4 cm. longa  $\frac{1}{2}$  cm. lata, apice acuta, basi leviter angustata, æquilata utraque pagine hirsuta, 3-nervia, nervis parallelis. Flores cymosi, pauciflorati, longe pedicellati, erecti, pedicellis  $3\frac{1}{2}$  cm. longis. Calyx cylindrico-obconicus, 1 cm. longus apice 5 mm. latus extus hirsutus intus glaber 10-nervius apice 5-lobatus, lobis oblongis 3 mm. longis 2 mm. latis apice obtusis margine ciliatis intus glabris extus hirsutis. Petala 5, longe spathulata, 1 cm. longa, cum calice æquilonga,  $2\frac{1}{2}$  mm. lata, apice latissima, 2-lobata, (lobis oblongis  $1\frac{1}{2}$  mm. longis apice rotundatis 1 mm. latis basi æquilatis, sinibus interlobos obtusis), deorsum cuneato-attenuata, ad basin  $\frac{1}{3}$  mm. lata, margine sursum integra, ad summum dentibus obtusis tenuibus 1- vel 2 utroque latere apicis instructa, deorsum integra a medio deorsum longe ciliata sursum non ciliata 3-nervia, sursum grosse reticulata. Stamina 10, 8 mm. longa, antheris oblongo-ovatis basi tenuiter lobatis  $\frac{2}{3}$  mm. longis. Ovarium cylindricum, stylis 3 brevibus 2 mm. longis.

HAB. Jyōgesha, leg. U. MORI, 1910, Aprili.; Namshiseimansha, 1908, Mart.

**Silene mushænsis** HAYATA sp. nov. Caulis altus. Folia lanceolato-oblongo-obovata 5 cm. longa  $1\frac{1}{2}$  cm. lata apice acuta basi attenuata in basi 4 mm. lata, utraque pagine hirsuta, costis et venis inconspicuis. Flores oppositum superpositum cymosi, pedicellis pubescentibus. Calyx cylindrico-oblongus, 8 mm. longus, apice 6 cm. latus, 10-nervius, extus pubescens intus glaber, apice 5-lobatus, lobis patentibus reflexis triangularibus 2 mm. longis apice obtusis vel acutis margine ciliolatis. Petala 5 cuneato-obovata, 8 mm. longa,  $3\frac{1}{2}$  mm. lata, apice tenuiter 4-lobata, (lobis 2 lateralibus obscuris, 2

centralibus  $1\frac{1}{2}$  mm. longis apice obtusissimis), intus facie prope apicem supra medium obscure 2-squamata, basi cuneato-attenuata, 3-nervia. Stamina 10, petalis breviora, stylis 3.

HAB. Nantō: Musha, leg. U. MORI, Jan. 1908.

Differs from *S. Morii* HAYATA by the much broader leaves and 4-lobed petals. Also near *S. firma*, but distinguishable from it in having less emarginate petals and in the markings of seeds.

### *Melandrium* ROEHL.

***Melandrium morrisonmontanum*** HAYATA sp. nov. Perennis. Rhizomata gracilia repentia, apice caules 5-6 gerentia. Caulis gracilis simplex teres subscandens,  $\frac{1}{2}$ -1 mm. in sectionis diametro, brevissime hirsutus, toto longitudine foliatus. Folia linearia angustissima opposita  $2\frac{1}{2}$ -3 cm. longa,  $2\frac{1}{2}$  mm. lata, apice acuta, basi æquilata, caulem semi-amplectantia, in exsiccatō utraque pagine minute tuberculata, costis supra impressis inconspicuis, subtus elevatis distinctis, venis et venulis inconspicuis, margine tenuissime marginata, ad marginem sub lente minute serrulata. Flores terminales, solitarii, pedicellis 6 mm. longis dense pubescentibus, pilis retrorsis, basi bracteis 2 instructis, bracteis foliaceis lanceolatis 13 mm. longis  $2\frac{1}{2}$  mm. latis apice acuminatis utraque pagine glanduloso-punctatis margine ciliolatis, ciliis patentibus vel retrorsis. Calyx inflatus, breve cylindrico-campanulatus, 18 mm. longus apice latissime 12 mm. latus, basi interior intrusus 5 mm. latus, extus intusque præsertim ad nervos hirsutus, 5-nervius, et 5-internervis, tenuibus instructus, tenuiter semi-hyalinus, apice 5-lobatus, lobis triangularibus 5 mm. latis 4 mm. longis, versus apicem alis dilatatis margine apice ciliolatis deorsum non ciliolatis integris instructis, dorso apice costatis. Torus 4 mm. longus cum gynophora 6 mm. longus, gynophoris  $1\frac{1}{2}$  mm. longis. Petala 5, longe unguiculata, cum unguibus 2 cm. longa, unguibus cum calyce æquilongis 12 mm. longis apice dilatatis laminiformibus obovatis deorsum linearibus, (partibus dilatis trinervis obovatis 5 mm. longis  $4\frac{1}{2}$  mm. latis subito attenuatis ad linearem abeuntibus), deorsum linearibus  $\frac{1}{2}$  mm. latis; laminis obovatis grosse reticulatis 7 mm. longis quam ungue brevioribus apice 7 mm. latis a medio sursum furcatim 2-lobatis, (lobis oblongo-rectangularibus 4 mm.

longis  $2\frac{1}{2}$  mm. latis apice obtusis, sinibus interlobos acutis vel obtusis, lobis a se angulo  $45^\circ$  divaricatis basi æquilateralibus) basi cuneato-attenuatis, basi  $1\frac{1}{2}$  mm. latis squamis 2 instructis, squamis oblongis rectangularibus 2 mm. longis 1 mm. latis basi æquilateralibus apice obtusis. Stamina 10, cum unguibus petalorum æquilonga. Ovarium oblongum, (gynophoris  $1\frac{1}{2}$  mm. longis)  $3\frac{1}{2}$  mm. longum 2 mm. latum, styli 3. Fructus ignoti.

HAB. Monte Morrison, leg. S. SASAKI, Oct. 1909.

**Melandrium transalpinum** HAYATA sp. nov. Perennis. Caulis cæspitosus ascendens, simplex 10 cm. altus toto longitudine foliosus, minute tuberculoso-hirsutus, ad nodos plus minus tumidus. Folia linearia internodium æquantia  $1\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  mm. lata, apice acuminata, basi attenuata, cum eo opposito connata vaginam 2 mm. longam formantia, utraque pagine minute tuberculata, margine ciliolata. Calyx cylindrico-obconicus, 13 mm. longus, 1 cm. latus, erectus, basi interior intrusus, extus hirsutus intus subglaber, 5-nervatus, apice 5-lobatus, lobis triangularibus  $3\frac{1}{2}$  mm. longis 4 mm. latis apice obtusis medio sursum margine ciliatis intus integris. Petala longe unguiculata, cum unguibus 16 mm. longa, (unguibus 1 cm. longis sursum gradatim ad laminam abeuntibus, apice  $3\frac{1}{2}$  mm. latis basi attenuatis cuneiformibus), lamina 7 mm. longa apice 6 mm. lata apice alte furcatim 2-lobata (lobis rectangularibus apice truncatis  $3\frac{1}{2}$  mm. longis 2 mm. latis), basi leviter angustiore ad unguem abeunte vel ad basin contracta squamis 2 instructa, squamis late rectangularibus  $2\frac{1}{2}$  mm. latis  $1\frac{1}{2}$  mm. longis apice truncatis margine denticulatis. Stamina 10. Torus validus tementosus  $2\frac{1}{2}$  mm. longus, gynophoris 10 mm. longis. Styli 4.

HAB. In montibus centralibus, leg. U. MORI et S. KATŌ, Dec. 1909.

Near *M. morrisonmontanum* HAYATA, but differs from it in having smaller leaves, broader petals and in its smaller form.

**Melandrium vesiculiforme** HAYATA sp. nov. Caulis basi prostrato-scandens, solum basi ramosus, ramis ascendentibus simplicibus, 30–40 cm. longis, cortice inferne minute tuberculato, sursum dense retrorse hirsutus, in toto longitudine foliatus. Folia opposita, linearia cum internodiis æquilonga,

5 cm. longa 2-2½ mm. lata, apice acuminata, basi leviter angustata cum eo opposito connata vaginam 2½ mm. longam formantia, utraque pagine minute tuberculata, margine ciliolata, costis subtus elevatis. Flores terminales, solitarii. Calyx inflatus, subglobosus, vel globoso-campanulatus, 1½ cm. longus totiusque latus, apice 5-lobatus, (lobis erectis triangularibus 7 mm. latis 5 mm. longis apice obtusis leviter dilatatis margine sursum dense ciliatis, deorsum nervoso-emarginatis non ciliatis integris), 5-nervatus tenuis, semi-hyalinus, utraque pagine præsertim ad nervos dense hirsutus, grosse reticulatus, basi interiore intrusus. Petala 5 longe unguiculata, cum unguibus 2 cm. longa, (unguibus 12 mm. longis calycem subæquantibus, longe lineari-cuneiformibus apice 4 mm. latis deorsum sensim attenuatis basi 1 mm. latis medio trinerviis); lamina patente obcordata 8 mm. longa apice 7 mm. lata, apice alte furcatim 2-lobata, (lobis late oblongis 4 mm. longis totiusque latis apice rotundatis basi æqualibus grosse reticulatis) basi cuneata, basi usque ad 2 mm. in lato contracta, basi callis 2 globosis et supra eos squamis 2 instructa, squamis flabelliformibus 1½ mm. longis longitudinaliter plicatis, apice lobulatis. Stamina 5 cm. longa calycem æquantia. Torus 2½ mm. longus validus tomentosus, gynophoris 1 mm. longis hirsutis. Styli 4.

HAB. In Mt. Morrison, 12000 ped. alt., leg. S. SASAKI.

Near *M. morrisonmontanum* HAYATA, but differs from it by the longer leaves, much more swollen calyx and broader petals.

### *Arenaria* LINN.

***Arenaria petiolata*** HAYATA sp. nov. Herba tenuissima 10-20 cm. longa, prostrato-scandens. Caulis tenuiter et breviter retrorso-pubescentis vel subglabratus. Folia opposita ovato-spathulata, subpetiolata, 12 mm. longa 5 mm. lata, apice obtusa, basi subito attenuata, ad petiolum 4 mm. longum abeuntia, tenuissima, utraque parce hirsuta, margine ciliata, petiolata, sed superiora subsessilia. Flores cymose subsolitarii, pedicellis 1 cm. longis. Sepala inæqualia alia oblonga, alia lanceolata 4 mm. longa, 1-1½ mm. lata, dorso prominente costata, margine hyalina, alia ciliolata, alia non ciliolata. Petala 5 quam sepalis multo breviora oblonga brevissime unguiculata, 1½-1



mm. longa apice obtusa, inclusa. Stamina 10. Styli 3. Capsula oblonga 3 mm. longa, carpellis 3, apice bifidis.

HAB. Nanto, Mart. 1910, leg. T. KAWAKAMI.

Near *A. serpyllifolia* LINN., but differs from it by the petiolate leaves and very much smaller petals.

### *Sagina* LINN.

***Sagina echinosperma*** HAYATA sp. nov. Herba humilis; caulis foliifer erectus brevis a basi caulem floriferum emittens, omnino glaber. Folia caulis foliiferi lineari-filiformia erecto-patentia, 18 mm. longa,  $\frac{1}{3}$ – $\frac{2}{3}$  lata, margine parce ciliolata basi cum iis oppositis connata. Folia caulis floriferi breviora 8 mm. longa. Flores cymose subsolitarii, pedicellis 2 cm. longis. Sepala 5, oblonga 3 mm. longa, 2 mm. lata, apice obtusa, 3-nervia, extus hirsuta, pilis glandulosis globuliferis, utrinque glanduloso-flavo-punctata. Petala 5, variabilissima in magnitudine, oblonga, brevissime unguiculata, 2½ mm. longa, 1½ mm. lata, apice obtusa, basi acuta ad unguem brevem abeuntia. Stamina 5? Capsula subglobosa, carpellis 5, denum distinctis. Semina oblique globoso-oblonga ½ mm. longa, testa tenui, minute et breve echinato-muricata.

HAB. Mt. Morrison, ad 9000 ped. alt., leg. S. SASAKI., Oct. 1909.

Near *S. Linnei*; but differs by the very much thinner testa of the seeds and in other points.

### *Cerastium* LINN.

***Cerastium subpilosum*** HAYATA sp. nov. *C. pilosum* HAYATA Fl. Mont. Formos. p. 58, (non LEDEB.). Gracillima; caulis 30–40 cm. altus, tenuiter pilosus, pilis patentibus. Folia opposita, sessilia lineari-oblanccolata, 3½–4 cm. longa, 4 mm. lata, apice acuta, basi attenuata, supra parce aristato-pilosa, subtus glabra, pallida, margine remote ciliolata, costis supra tenuissime sulcatis subtus elevatis, venulis inconspicuis. Flores laxissime cymosi, pedicellis gracillimis 1–2 cm. longis viscoso-pilosis. Sepala 5, ovato-oblonga, 2–3 mm. longa, apice obtusa, dorso et margine parce ciliata, integra, 1¼ mm. lata. Petala 5, lineari-spathulata, 3½ mm. longa,  $\frac{1}{2}$ – $\frac{1}{3}$  mm. lata, apice rotundata, basi attenuata. Stamina 5. Ovarium ovoideum 1½ mm. longum, stylis 4–5. Capsula cylindrico-

globosa  $3\frac{1}{2}$  mm. longa, 2 mm. lata, apice truncata, basi obtusa, ore 8-10-dentata, dentibus obtusis erectis. Semina oblongo-globosa leviter complanata, 1 mm. longa, rubescentia, minute tuberculata.

HAB. Monte Morrison, 1908, leg. T. KAWAKAMI.

Near *C. pilosum*, but differs from it by the smaller less hairy leaves and in many other points. I fail to compare this to any other species of this genus.

### *Stellaria* LINN.

***Stellaria arisanensis* HAYATA n. n.**

*Cerastium arisanensis* HAYATA Mater. Fl. Formos. p. 35, et Ic. Pl. Formos. p. 69, t. 13.

As is clearly seen from the construction of the fruits, the plant should be properly referred to *Stellaria*.

***Stellaria arisanensis* HAYATA var. *leptophylla* HAYATA n. v.** Folia majora, longe petiolata, ovato-rhomboida,  $2\frac{1}{2}$  cm. longa 17 mm. lata, apice acuta, ad summum breve aristata, basi subrotundata, ad extremitatem subito acuta et attenuata ad petiolum  $1\frac{1}{2}$  cm. longum abeuntia. Flores similes cum typica.

HAB. Rontabunsan, leg. U. MORI.

Distinguishable from the type only by the much larger shape of the leaves. It may prove to be a summer form of the type when the habit is fully known.

***Stellaria uliginosa* MURR. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 36.**

HAB. Arisan: Banzuisan, leg. B. HAYATA et S. SASAKI, Jan. 1912.

## Hypericineæ.

### *Hypericum* LINN.

***Hypericum formosanum* MAXIM. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 41.**

HAB. Kusukusu, Mai. 1912, leg. B. HAYATA et S. SASAKI.

**Hypericum geminiflorum** HEMSL.; MATSUM. et HAYATA Enum. Pl. Formos. p. 41.

HAB. Loco non indicato, leg. U. MORI, Aug. 1912.

## Guttiferæ.

### *Garcinia* LINN.

**Garcinia multiflora** CHAMP. (Tab. IV.) MATSUM. et HAYATA Enum. Pl. Formos. p. 43; HAYATA Ic. Pl. Formos. I. p. 83. Frutex 2-3 m. alta, basi ramosissima, dense foliata. Ramuli recti glabri longitudinaliter sulcato-rugosi, glabri, viridescens, divaricate ramosi. Folia opposita, obovata vel obovato-cuneata, apice obtusa, basi cuneata, usque ad 8 cm. longa,  $3\frac{1}{2}$  cm. lata, æquilateralia vel  $\pm$  obliqua, chartacea, vel chartaceo-coriacea, utraque glabra, in exsiccatō subviridia concolora, supra glabra, sub microscopio minute lepidota, lepidibus minutissimis rotundatis, costis supra planis subtus elevatis, venis primariis supra obscure subtus distincte elevatis utroque latere costæ 10-11 subrectis vel  $\sim$ formiter curvatis angulo  $30^{\circ}$ - $40^{\circ}$  a costa divaricatis prope marginem per nervum marginalem contextis, petiolis angustissime subalatis  $1\frac{1}{2}$  cm. longis supra planis tenuissime sulcatis subtus convexis. Flores dioecii; corymbi  $\hat{\imath}$  terminales subpaniculati 5 cm. longi 3-4 cm. lati dichotome ramosi, (rhachidibus ad ramificationem peltato-annulariter tumidis utroque latere stipuliferis, stipulis minutissimis cuspidiformibus), pedicellis 7 mm. longis basi bracteis 1 instructis, bracteis triangularibus deciduis cuspidiformibus  $\frac{1}{2}$  mm. longis. Sepala 4 valde concava, imbricata, chartacea, rotundata, 2-exteriora majora 8 mm. longa, 2-interiora  $\pm$  minora 7 mm. longa rotundata basi contracta paralleliter multinervia, nervis circ. 10. Petala 4, obovato-cuneata, 11 mm. longa, 9 mm. lata, apice latissima rotundata, infra apicem usque ad basi recto-cuneata, basi 1 mm. lata, alba, divaricato-multinervia, subreticulata. Stamina 4, filamentis validiusculis rectis 4 mm. longis apice rotundato dilatatis antheriferis, antheris  $\infty$  sessilibus 2-ocularibus. Rudimentum ovarii columnare, subcomplanatum, apice peltato-dilatatum, botrioides-tuberculatum.

HAB. Kusukusu prope Botansha, leg. B. HAYATA et S. SASAKI, Juni. 11, 1912.

This very rare and handsome tree was for the first time in June last year collected by Mr. S. SASAKI and myself, in my last journey to the island. It was found on a crag by the mountain pass from Kusukusu to Botansha, which was quite an unbeaten track for any one except for savages. The flowers have a so close resemblance in its external feature to those of *Euonymus* that I was led to mistake the plant for one of the Celastrus-family. It was first recorded from the island by Dr. A. HENRY. So far as I can judge from the description given in BENTH. Fl. Hongk. p. 25, the present plant may be identical with this species.

## Ternstroemiaceæ.

### *Anneslea* WALL.

***Anneslea fragrans* WALL. var. *lanceolata* HAYATA n. v. (Tab. V.)**  
 Arborescens. Rami et ramuli validi cinerascetes rugosi glabri. Folia lanceolata, oblongo-lanceolata vel interdum obovato-lanceolata, 10-12 cm. longa, 3 cm. lata, apice subito acuta ad summum obtusa, basi acuta ad extremitatem attenuata ad petiolum abeuntia, utraque pagine glabra, supra nitida subtus pallida opaca sub lente parce punctata, costis supra impressis subtus elevatis, venis utraque pagine inconspicuis non visis, margine desuper recurvata integerrima, coriacea, in exsiccato fusco-flavescentia, petiolis 2-3 cm. longis teretibus supra non sulcatis sursum  $\pm$  obscure subalatis basi ad insertionem leviter obscure peltato-dilatatis. Flores versus apicem ramulorum brevissime racemose dispositi vel quasi-axillares, ad axillam folii solitarii, longe pedicellati, cernui vel penduli, pedicellis circ. 3 cm. longis petiolum in longitudine superantibus desuper recurvis glabris plus minus complanatis vel alatis apice latoribus cum alis 4 mm. latis apice sub flore 2-bracteatis, bracteis oppositis ovatis 5-6 mm. longis 4-5 mm. latis apice truncatis vel emarginatis ad centrum mucronatis basi vix contractis crassis dorso carinato-alatis (carinis  $\frac{1}{2}$  mm. latis apice ad mucronem attingentibus), margine

eroso-denticulatis ad apicem dentium  $\pm$  glanduloso-crassatis. Sepala 5, valde imbricata, semi-potentia, ovata vel rotundata, 1-1½ cm. longa, sursum margine introrse valde recurva, apice acuta basi rotundata contracta ad insertionem 3 mm. lata, utraque pagine glabra, crassiuscula, versus marginem tenuiora ad marginem tenuissima hyalina margine integra vel ciliata. Petala 5, 14-17 mm. longa basi alte in tubum 6 mm. longum connata, partibus liberis obovatis 10 mm. longis medio 6 mm. latis apice acuto-triangularibus basi cuneatis contractis 2-3 mm. latis ad basin utroque latere 1-auriculatis, auriculis obtusis vel obsolete, partibus connatis vel tubis 6 mm. longis, partibus liberis tenuissimis, partibus connatis minus tenuibus multinerviis, nervis parallelis ad basin partis liberæ convergentibus sursum et deorsum divergentibus ad utraque extremitatem petalorum  $\pm$  convergentibus, utraque pagine glabra. Stamina  $\infty$  circ. 40, 1- (vel 2?) seriatim disposita, glabra petalis paullo breviora, 13 mm. longa inclusa, filamentis 5 mm. longis complanatis crassiusculis  $\frac{2}{3}$  mm. latis, antheris adnatis basifixis linearibus 4-5 mm. longis 1½ mm. latis introrse dehiscentibus basi cordatis apice acutis connectivis apice in appendiculam longe productis, appendiculis linearibus apice acuminatis 3-4 mm. longis anthera paullo brevioribus. Ovarium semi-inferius vel semisuperius, late conicum 4 mm. latum, supra calycem brevissime exsertum, apice ad stylum abeuns, triloculare, loculis 3-ovulatis, ovulis e summum loculorum pendulis, stylo filiformi 1½ cm. longo apice brevissime 3-lobato, lobis circ. 1 mm. longis apice acutis intus sulcatis.

HAB. Hiiransan, prope Kusukasu, leg. B. HAYATA et S. SASAKI, 1912, Juli.

Very like the type, but differs from it in having narrower leaves and two larger bracts immediately below the calyx. Through the courtesy of Mr. E. D. Merrill of the Philippines, I was able to find a proper genus to which this plant should be referred. Very remarkable for its petals united to the middle.

### *Adinandra* JACK.

***Adinandra hainanensis*** HAYATA sp. nov. Rami fuscentes. Folia obovato-oblonga, coriacea, 10 cm. longa, 4½ cm. lata, apice breve cuspidato-acuta, ad summum obtusa, basi acuminata, (costis supra tenuiter impressis, subtus

elevatis, venis et venulis utraque pagine elevatis reticulatis), margine minute serrulata, petiolis 1 cm. longis intus subplanis extus rotundatis. Flores axillares solitarii pedicellati, pedicellis  $1\frac{1}{2}$  cm. longis recurvis, bracteis 2-3 instructis. Sepala fructifera 5 valde imbricata ovata apice acuminata, extus sericeo-pubescentia, intus glabra, 7-8 mm. longa, 6 mm. lata. Fructus subglobosi, apice extus sericeo-pubescentes apice rostrati, rostris 2 mm. longis cum stylo articulatis, stylis persistentibus adpresse sericeo-pubescentibus.

HAB. Hainan, leg. N. KONISHI, Juni. 1909, (No. 5).

Near *Adinandra lasiostyla* HAYATA, but differs from it by the serrulate leaves.

**Adinandra hypochlora** HAYATA sp. nov. Rami fuscentes. Folia obovato-oblonga, tenuiter coriacea, maxima 9 cm. longa  $3\frac{1}{2}$  cm. lata, apice breve acuminata, vel acuta, basi  $\pm$  attenuata vel acuminata, in exsicco supra fuscentia subtus flavescientia, costis supra impressis subtus elevatis, venis et venulis supra elevatis subtus tenuissime elevatis distinctis interdum inconspicuis, margine supra medium serrulata vel vix serrulata, deorsum integra, petiolis 5-6 mm. longis intus late sulcatis. Flores ignoti. Baccæ axillares, solitariae, (pedicellis 2 cm. longis apice  $\pm$  incrassatis), globosæ 1 cm. in diametro, adpresse pubescentes apice apiculatæ. Sepala fructifera oblonga, glabra persistentia 8 mm. longa, 4 mm. lata, apice obtusa, dorso medio costata, coriacea, margine tenuia, remote serrulata vel subintegra.

HAB. Tōkō, leg. Y. KIKUCHI, Aug. 1912.

Near *Adinandra lasiostyla* HAYATA, but differs from it in having quite glabrous sepals.

### *Thea* LINN.

**Thea gnaphalocarpa** HAYATA sp. nov. Frutex, rami graciles, cortice fuscenti longitudinaliter fissis demum soluto, ramulis sursum pilosis. Folia obovato-oblonga, coriacea, breve petiolata maxima,  $4\frac{1}{2}$  cm. longa, 2 cm. lata, apice obtusa vel breve acuta, basi cuneata vel acuta, margine serrulata (ad summum serrularum apiculata), margine  $\pm$  desuper recurva, utraque glabra, supra nitida, subtus pallida, costis venis et venulis utraque pagine elevatis,

interdum inconspicuis, petiolis 4 mm. longis tenuissime hirsutis intus late sulcatis. Flores axillares vel pseudo-terminales, solitarii vel gemini, sessiles, alabastro oblongo 8 mm. longo apice acuto. Sepala 5-10, decidua, extus hirsuta, inæqualia, (extimum minimum, intimum maximum) rotundata, maxima 8 mm. in diametro valde concava intus glabra. Petala 5, basi distincta, inæqualia exteriora latiora breviora rotundato-cuneata 12 mm. longa 10 mm. lata apice emarginata, interiora longiora angustiora 2 cm. longa 7 mm. lata apice 2-lobata, (lobis 3 mm. longis apice obtusis), basi angustata cuneata, basi utraque pagine glabra vel sursum extus  $\pm$  hirsuta. Stamina numerosa circ. 1 cm. longa, exteriora usque ad medium connata, interiora pauca distincta tota glabra, filamentis apice liberis tenuibus, antheris rotundato-reniformibus 1 mm. latis. Ovarium dense sericeo-pilosum globosum 2 mm. longum, stylis 3 usque ad infra apicem connatis 3 mm. longis.

HAB. Karapin, leg. S. SASAKI, 1910, Dec.

Very near *T. Sasanqua* MIQ., but differs from it in having much smaller flowers and smaller leaves. It may prove to be a variety of the latter, when the habit is fully known. Here is another specimen from Fokien resembling very much this plant, and it may probably be the same species.

***Thea parvifolia*** HAYATA sp. nov. (Tab. VI.) Frutex? ramosi, ramis gracilibus, cortice cinerascenti longitudinaliter soluto, ramulis apice patentopilosis. Folia coriacea rhomboideo-oblonga rhomboideo-lanceolata vel  $\pm$  ovata, 3 cm. longa 11 mm. lata, apice acuminata ad summum obtusa, basi cuneata, margine ascendente-serrulata versus basin integra, utraque pagine glabra, costis supra hirsutis subtus glabris, petiolis 4 mm. longis intus late sulcatis, venis et venulis non conspicuis. Flores ad apicem ramulorum pseudo-terminales solitarii brevissime racemosi 2 cm. in diametro, pedicellis 4 mm. longis vel 0 multi-bracteatis pubescentibus, bracteis inerioribus late triangularibus superioribus majoribus. Sepala 5-6, late rotundata, interiora majora 3 mm. lata 2 mm. longa extus pubescentia intus glabra margine ciliata. Petala 5 basi in tubo 3 mm. longo connata, valde inæqualia, rotundata vel oblonga, 10-12 mm. longa, alia crassiuscula extus hirsuta intus glabra, alia tenuia utraque pagine glabra apice rotundata. Stamina

numerosa, 1 cm. longa, intima 5 libera, exteriora alte connata, tubum formantia, tubo cum petalis adnato, filamentis parte libera incrassatis versus apicem tenuissime filiformibus, antheris triangularibus, loculis basi sagittato-divergentibus. Ovarium globosum apice ad stylum abeuns sericeo-tomentosum, stylo filiformi 13 mm. longo sericeo-pubescenti apice 3-fido, ramis 1 mm. longis.

HAB. Mt. Randaisan, leg. U. MORI, Mart. 1908, (No. 3549).

Near *T. lutchuensis* ITO; but differs from it by the much smaller and acuminate leaves.

## Dipterocarpeæ.

### *Ancistrocladus* WALL.

***Ancistrocladus hainanensis*** HAYATA sp. nov. Rami teretes, fuscentes, glabri, læves, lenticellis linearibus notati, ramulis unciferis, uncis semi-circularibus validis. Folia variabilissima alterna, chartacea vel chartaceo-coriacea, oblonga, oblongo-obovata, obovato-lanceolata, 40–6 cm. longa, 10–3 cm. lata, apice rotundata vel obtusa, basi attenuata spathulata sessilia, a basi 5–6 mm. lata, margine integra, utraque pagine sub lente minute albo-lepidoto-punctata, (lepidibus rotundatis margine lobulatis), et sub lente minute parceque impresso-punctata, costis supra impressis, subtus elevatis, venis utraque tenuiter elevatis, venulis tenuissimis reticulatis, margine integra. Flores spicato-paniculati, paniculis terminalibus, floribus spicatim dispositis, paniculis 10 cm. longis 8 cm. latis, sub floribus singulis 1-bracteatis, bracteis minutis 2 mm. longis oblongo-triangularibus margine serrulatis. Sepala 5, basi connata, 6 mm. longa, intus lepidota, oblonga, imbricata, glabra. Petala 5, imbricata, oblonga,  $4\frac{1}{2}$  mm. longa, apice rotundata, glabra, intus lepidota. Stamina 10, ad basin petali affixa,  $1\frac{1}{2}$  mm. longa, antheris subcordatis apice emarginatis basi cordatis  $\frac{1}{2}$  mm. longis, loculis divaricatis, filamentis basi  $\pm$  dilatis. Ovarium inferius 1-loculare 1-ovulatum, ovulis amphitropis, stylo 3-fido, ramis  $1\frac{1}{2}$  mm. longis apice valde oblique dilatis. Calyx fructifer valde accrescens, tubus 5 mm. longus, lobis inæqualibus, majoribus obovato-spathulatis 4 cm. longis 2 cm. latis basi



3 mm. latis elevato-reticulato-venosis, minoribus  $2\frac{1}{2}$  cm. longis. Fructus calycis tubo adnatus turbينات vertice subplanus, calycis laciniis alæformibus cinctus. Semen subglobosum, albumen ruminatum.

HAB. Hainan, leg. Z. KATSUMADA, 1909.

## Sterculiaceæ.

### *Sterculia* LINN.

***Sterculia luzonica*** WARB.; MERRILL Fl. Manila p. 327.

OBSERV. Folia alterna oblongo-cordata 11 cm. longa 7 cm. lata, apice subito acuminata ad summum obtusa, basi cordata chartacea vel tenuiter coriacea, margine integerrima, utraque pagine glabra, basi 5-7 nervia, venis lateralibus utroque latere 6 a costa angulo  $50^\circ$  egressis, petiolis 3 cm. longis teretibus. Folliculi gemini divaricati vel solitarii, breve stipitati, apice brevissime rostrati breve villosi-pubescentes rugulosi, oblique semi-globosi, 4-5 cm. longi 3 cm. lati, inflati, extus in exsiccato fusco-flavescentes, intus subrubrescentes, valvis incrassatis lignosis. Semina in carpellis singulis 2, ellipsoidea 18 mm. longa 11 mm. lata, utrinque obtusa vel rotundata, tenuissime latere compressa, testæ exocarpium tenuiter chartaceum subnitidum nigricans  $\pm$  obscure et tenuissime striatum, mesocarpium pulveraceum, endocarpium chartaceum nitidum nigricans.

HAB. Kōtōshō, leg. U. MORI et S. SASAKI, 1911, Aprili.

This somewhat differs from the type in having acuminate leaves and much thinner broader carpels.

## Tiliaceæ.

### *Triumfetta* LINN.

***Triumfetta semitriloba*** LINN.; MASTERS in HOOK. f. Fl. Brit. Ind. I. p. 396; MERRILL Fl. Manila p. 314.

HAB. Karapin, Jan. 1912, leg. B. HAYATA et S. SASAKI.

DISTRIB. India and the Philippines.

## Malpighiaceæ.

*Ryssopteris* BLUME.

**Ryssopteris Cumingiana** A. JUSS. in VIDAL Phanerog. Cum. Philipp. p. 99.

HAB. Kōtōshō, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912.

Determined by Mr. T. KAWAKAMI at Manila in his trip to the Archipelago.

*Hiptage* GÆRTN.

**Hiptage leptophylla** HAYATA sp. nov. Rami fusco-purpurascens vel fuscentes, recti, graciles. Folia opposita membranacea, ovata vel ovato-oblonga, rarius obovata, maxima 8 cm. longa 4 cm. lata, apice abrupte acuta vel apiculato-acuta, basi late cuneata vel rotundato-acuta, costis venis et venulis utraque pagine tenuissime elevatis distinctis, supra glabra, subtus ad et prope costam adpresse hirsuta, petiolis 5 mm. longis adpresse hirsutis. Racemi axillares vel terminales, oppositi, plerumque ad axillas gemini, 5-6 cm. longi dense vel laxe florati, rhachidibus et pedicellis adpresse pubescentibus, bracteis subulato-lanceolatis 2-3 mm. longis, pedicellis 5-10 mm. longis. Sepala 5, inæqualia oblonga vel oblongo-rectangularia, apice rotundata, basi æquilata, circ. 4 mm. longa 2½ mm. lata, extus adpresse pubescentia intus glabra, sed basi hirsuta. Petala 5 rotundato-oblonga, 13 mm. longa 9 mm. lata, apice rotundata, basi brevissime unguiculata, (unguibus angustissimis ⅓ mm. latis 2 mm. longis) extus adpresse hirsuta intus glabra margine fimbriata multinervata. Stamina 10, declinata, omnia fertilia, unum ceteris multo majus. Stylus 1 filiformis primum circinnatus, stigmatibus capitellato rarius truncato.

HAB. Tandai-sha, Jyōgesha, leg. U. MORI, Aprili. 1910.

Near *H. Madablota* GÆRTN.; but differs from it in having much shorter racemes, smaller flowers and very much thinner and smaller leaves. It differs also from *H. obtusifolia* DC., by the ovate acute leaves.

## Rutaceæ.

*Xanthoxylum* LINN.

**Xanthoxylum? pistaciiflorum** HAYATA sp. nov. Rami recti, cortice rubro-fuscenti, lenticellis elevatis subpeltatis 2-lobatis notati. Folia alterna trifoliolata, in ambitu triangulari-rhomboidæa, foliolo terminali maximo obovato-oblongo  $6\frac{1}{2}$  cm. longo 27 mm. lato apice obtuso ad summum retuso basi attenuato ad petiolulum  $\frac{1}{2}$  cm. longum abeunti tenuiter coriaceo basi integro supra basin usque ad apicem tenuissime breve crenato-serrato, serris brevissimis, costa supra impressa vel elevata subtus elevata, venis lateralibus tenuissime distincte elevatis rectis prope marginem furcatis, supra nitida, subtus non nitida, petiolulis subalatis, foliolis lateralibus minoribus dimidium terminalis æquantibus, petiolis communibus 2 cm. longis subteretibus intus sulcatis vel angustissime alatis. Flores ♂: paniculati, paniculæ axillares 3 cm. longæ laxè floratæ, pedicelli 2-3 mm. longi basi 1-bracteati, bracteis spathulato-linearibus  $\frac{1}{2}$  mm. longis apice ciliato-fimbriatis. Sepala 5, spathulato-linearia,  $1\frac{1}{4}$  mm. longa,  $\frac{1}{2}$  mm. lata, apice obtusa, glabra. Petala 0. Stamina 5, sepalis opposita, sepalis longiora  $1\frac{1}{2}$  mm. longa, antheris late cordatis introrsis apice obscure apiculatis. Rudimentum ovarii minutum globoso-pyramidale.

HAB. Akō: Bongarisha, leg. G. NAKAHARA et SASAKI.

Somewhat resembles *Z. ovalifolium*, but greatly differs in the floral structure.

**Xanthoxylum pteropodum** HAYATA sp. nov. Rami subrecti, glabri, ut videntur enermes. Folia imparipinnata, in ambitu obovato-lanceolata, 24 cm. longa 8 cm. lata, 21-17 foliata, foliolo terminali longissime lanceolato 6-7 cm. longo  $1\frac{1}{2}$  cm. lato apice acuminato basi cuneato-acuto chartaceo, (costa supra impressa subtus elevata), supra fuscenti subtus pallidissimo, (venis lateralibus supra non visis subtus tenuissime distinctis elevatis), margine tenuiter crenulato-serrato, ad sinus inter serras calloso-punctato, non petiolulato, foliolis lateralibus superne majoribus inferne minoribus eo terminali

conformibus sed multo minoribus, iis basiralibus minimis oblongis apice obtusis basi acutis brevissime petiolulatis, petiolis communibus 15 cm. longis, angustissime alatis intus planis semiteretibus. Paniculæ ♀ terminales folio multo breviores 4-5 cm. longæ, bracteis minutis lanceolatis  $\frac{1}{3}$  mm. longis. Carpella matura globosa, 3 mm. in diametro; semina nitida.

HAB. Arisan, leg. G. UYEMATSU, 1912.

Near *X. piperitum* DC., but differs from it in having winged common petiols and acuminate leaflets.

### *Fagara* LINN.

***Fagara laxifoliolata*** HAYATA. sp. nov. Scandens? Rami subrecti, brevissime remoti aculeati, aculeis 1-2 mm. longis desuper recurvis acutis, cortice fuscenti ruguloso superne minute parceque lenticellato. Folia alterna, in ambitu ovata 20-25 cm. longa 12 cm. lata, impari-pinnata laxe foliolata, pinnis 11-13, foliolo terminali maximo obovato-oblongo 8 cm. longo  $3\frac{1}{2}$  cm. lato apice longe cuspidato ad summum obtuso basi subito attenuato ad petiolulum abeunti chartaceo chartaceo-coriaceo margine subintegro supra nitido, costa supra impressa subtus elevata, venis rectis utraque pagine tenuiter distincte elevatis), petiolulo circ. 2 cm. longo, foliolis lateralibus terminali minoribus breve petiolulatis, iis basilaribus 4 cm. longis basi  $\pm$  obliquis, petiolulis  $\frac{1}{2}$  cm. longis, petiolis communibus 15 cm. longis teretibus supra sulcatis gracilibus. Paniculæ ♀ axillares 5-7 cm. longæ. Fl. ♀: pedicellis 2-3 mm. longis tenuissime pubescentibus basi 1-bracteatis, bracteis triangularibus  $\frac{2}{3}$  mm. longis obtusis. Calyx 4-partitus, sepalis triangularibus obtusis 1 mm. longis incrassatis, margine tenuissimis. Petala 4, imbricata, ovata, 3 mm. longa 2 mm. lata, apice obtusa, crassiuscula, margine tenuia sub lente minute denticulata. Rudimenta staminum 4. Carpella 4 cum stylo reflexo rostrata.

HAB. Shichiseitonzan, leg. Y. SHIMADA, Aprili. 1911.

Near *F. Avicennæ* DC., (BENTH. Fl. Hongk. p. 58); but differs from it in having flowers with four carpels and cuspidate leaflets.

*Muraya* LINN.

***Muraya omphalocarpa*** HAYATA sp. nov. Frutex?; rami glabri, cinerascens. Folia alterna pinnata 3-5-foliolata, foliolo terminali majore obovato 7 cm. longo 4 cm. lato apice cuspidato breve acuto ad summum obtuso vel retuso basi cuneato-acuto coriaceo, (costa supra late sulcata subtus elevata, venis utraque pagine tenuiter elevatis utroque latere 7-8 rectis apice furcato-ramosis), in exsiccatu utraque pagine pallido margine subintegro vel remote vel obscure crenato, petiolulo brevissimo 3 mm. longo intus sulcato, foliolis lateralibus alternis terminali conformibus sed minoribus, petiolis communibus 5-6 cm. longis intus planis extus convexis. Flores pseudo-umbellati, umbellis quasi-terminalibus sessilibus 5-6-radiatis, radiis 1-1½ cm. longis, floribus 1½ cm. longis. Calyx basi campanulatus alte 5-partitus, sepalis oblongo-linearibus 2½ mm. longis 1½ mm. latis apice crassiusculis tenuiter pubescentibus. Petala 5, oblongo-lanceolata 23 mm. longa 8 mm. lata, apice obtusa vel acutiuscula, basi attenuata, basi 1 mm. lata margine deorsum integra sursum crenulato-repanda. Stamina 10, altera longiora 14 mm. longa, altera 11 mm. longa, filamentis complanatis, antheris reniformibus utrinque emarginatis. Discus incrassatus pulviniformis. Ovarium oblongo-cylindricum circ. 3 mm. longum 1 mm. latum, subglabrum vel basi tenuissime hirsutum, basi ad stipitem brevem attenuatum, apice ad stylum abeuns, stylo 1 cm. longo glabro, stigmate subpeltato integro vel obscure 2-lobato. Bacca ovoidea 2 cm. longa, 1-1½ cm. lata, rubra, longe rostrata, basi contracta ad stipitem brevem 1-2 mm. longum abeuns, 2-locularis, loculis 1-spermis, pericarpio rubro glanduloso-punctato crasso. Semina oblonga, tenuiter complanata, 12 mm. longa, dense fibroso-barbata, barbis 7 mm. longis, testa tenui, cotyledonibus oblongis, radícula minutissima.

HAB. Kōtōshō et Kwashōtō.

Near *M. exotica*, but differs from it by the larger rostrate fruits and petals with attenuate base.

## Meliaceæ.

*Chisocheton* BLUME.

***Chisocheton kusukusense*** HAYATA (Tab. VII.) Frutescens vel arborescens. Rami cortice fusco-rubescenti. Folia pinnata ampla 35 cm. longa vel longiora pari- vel impari-pinnata membranacea vel chartacea 7-8-foliolata in ambitu obovata, foliolis oblongis vel ovatis vel ovato-oblongis 8-15 cm. longis 5-3 cm. latis apice acutis ad summum obtusis basi acutis vel obtusis vel rotundatis utrinque glabris, (costa supra plana subtus elevata, venis lateralibus supra planis inconspicuis subtus tenuiter distincte conspicuis, venis secundariis non visis), breve petiolulatis. Paniculæ axillares erectæ laxè floratæ foliis breviores, pedicellis 1- $\frac{1}{2}$  cm. longis hirsutis multi-bracteatis, bracteis triangularibus 1 mm. longis acutis hirsutis, pedicellis infra calyceem articulatis. Calyx campanulatus hirsutus 4-dentatus, dentibus latissimis brevissimis. Petala 4, erecto-patentia extus hirsuta intus glabra valvata, angusta 8 mm. longa 2-2 $\frac{1}{2}$  mm. lata, basi sensim angustiora, apice obtusa incrassata, margine tenuia, basi æquilata. Tubus staminalis 6 $\frac{1}{2}$  mm. longus 3 $\frac{1}{2}$  mm. in diametro, apice margine integer, glaber, prope apicem anteriore antheras sessiles gerens, antheris 8 oblongo-linearibus. Discus tubuliformis ovarium amplexans apice hirsutus. Ovarium conicum 1 mm. longum apice ad stylum abeuns, stylo recto cum tubo staminali æquilongo, stigmate late peltato, pelta rotundata 1 mm. in diametro.

HAB. Hieranzan, leg. B. HAYATA et S. SASAKI, Juli, 1912.

Near *C. hongkongensis* TUTCHER (Journ. Linn. Soc. XXXVII. p. 64), but differs from it by the larger 4-merous flowers.

*Aglaia* LOUR.

***Aglaia formosana*** HAYATA n. n.

*Aglaia cleagumoides* BENTH. var. *formosana* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 78.

## Ilicineæ.

*Ilex* LINN.

***Ilex cleyeroides*** HAYATA sp. nov. Ramuli glabri fuscentes vel fusco-rubescens non lenticellati. Folia alterna glaberrima, coriacea, obovato-oblonga vel obovato-lanceolata, 8 cm. longa, 3 cm. lata, apice subito-acuta vel breve cuspidato-acuta, ad summum obtusa vel tenuiter retusa, (costis supra tenuiter impressis sulcatis, subtus elevatis venis et venulis utraque pagine tenuiter elevatis), in exsiccato utraque pallida sed subtus pallidissima, margine integra, tenuissime recurvata, petiolis laminam  $\frac{1}{10}$ -plo æquantibus 8 mm. longis incrassatis intus profunde sulcatis extus minute transversim rugulosis. Fructus ad axillas foliorum 5-6 longe pedicellati, pedicellis petiolum 2-plo superantibus erectis. Calyx fructifer patens 1 cm. longus 5-lobatus, lobis late triangularibus 2 mm. latis 1 mm. longis apice obtusis denticulatis deorsum integris. Fructus depresso globosi 6 mm. lati.

HAB. Formosa, loco non indicato.

Near *I. memecylifolia* CHAMP.

***Ilex glomeratiflora*** HAYATA sp. nov. Rami graciles recti glabri longitudinaliter rugulosi pallidi. Folia concolora virido-pallidissima in exsiccato, oblongo-lanceolata 9 cm. longa 28 mm. lata, chartacea vel tenuiter coriacea, apice longe acuminata vel caudato-acuminata (acuminibus 1 cm. longis  $1\frac{1}{2}$  mm. latis) basi acuta vel cuneato-acuta utraque glabra, margine subintegra vel obscure serrulata, (serrulis interdum obsoletis), margine plana non recurvata costis supra sulcatis subtus elevatis, venis lateralibus supra inconspicuis subtus tenuissime elevatis utroque latere 8-10, ~formiter recurvis, petiolis gracilibus laminam  $\frac{1}{3}$ -plo æquantibus supra sulcatis. Flores ♂: ad axillas glomerati, pedicellis  $1\frac{1}{2}$  mm. longis glabris basi bracteis instructis, bracteis oblongis obtusis  $\frac{2}{3}$  mm. longis margine ciliolatis. Calyx 4-lobatus, lobis rotundatis extus parissime brevissimeque hirsutis margine ciliolatis  $\frac{2}{3}$  mm. longis. Corolla subrotata generaliter 4-lobata, tubo  $\frac{1}{2}$  mm. longo, lobis oblongis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis basi ±

contractis valde concavis reflexis patentibus margine integris glabris. Stamina 4, longe exserta, ad faucem tubi corollæ affixa, filamentis lobo corollæ longioribus 3 mm. longis complanato-filiformibus patentibus, antheris ovato-cordatis  $\frac{2}{3}$  mm. longis apice obtusis. Rudimentum ovarii subconicum 4-sulcatum.

HAB. Arisan, leg. S. SASAKI, 1910, Mart., (Fl).

Near *I. formosana* MAXIM., but differs from it by the more acuminate, thinner and subentire leaves.

***Ilex Hanceana*** MAXIM. in Mém. Acad. Sc. Pétersb. 7e Série, XXIX. (1881), p. 33.

*Ilex goshiensis* HAYATA Mater. Fl. Formos. p. 54.

***Ilex kelungensis*** LOES. Monogr. Aquifoliac. p. 335.

Near *I. formosana* MAXIM.

***Ilex lonicerifolia*** HAYATA sp. nov. (Tab. VIII.) Ramuli veteriores subteretes pubescentes, cortice fuscenti lenticellato, novelli triquetri, angulis acutis, villosopubescentes, pilis fuscentibus. Folia alterna elliptica, ovato-vel obovato-elliptica, 6 cm. longa 3 cm. lata, apice acuta vel obtusa, basi obtusa, supra dense subtus tenuiter brevissime pubescentia, in exsiccatum supra fuscentia subtus pallida, chartacea vel tenuiter coriacea, costis supra planis vel tenuissime elevatis vel impressis dense pilosis, subtus distincte elevatis dense pilosis, venis lateralibus primariis utroque latere 9–10 mediis angulo 60° a costa divaricatis tenuissimis supra vix elevatis subtus haud elevatis vel tenuissime impressis distinctis rectis prope marginem furcatim anastomosantibus, margine manifeste recurvata, basi plicato-recurvata, integerrima, petiolis 6–7 mm. longis dense fusco-villosis supra sulcatis, pulvinis elevatis. Flores subumbellati, umbellis axillaribus pedunculatis, pedunculis fusco-pubescentibus 18 mm. longis pedicello longioribus triquetris, bracteis elongato-triangularibus, pedicellis circ. 1 cm. longis. Flores patentes 6–7 mm. in diametro, 5–6–7-meri. Calycis lobi 5–7, lobis imbricatis extus pubescentibus intus glabris rotundatis 1–1½ mm. in diametro basi leviter contractis margine ciliatis. Corolla patens



6-7 mm. in diametro 5-lobata, lobis 5 oblongis  $2\frac{1}{2}$  mm. longis 2 mm. latis apice rotundatis basi  $\pm$  contractis margine integris. Staminoidia 5, ad faucem corollæ inserta, filamentis dilatatis  $\frac{1}{2}$  mm. longis, antheris late sagittato-triangularibus apice obtusis basi late obtuse sagittatis. Ovarium globosum cum stigmate 2 mm. longum, stigma sessile subconicum 5-lobatum vel 5-sulcatum apicem ovarii coronans. Ovarium 5-loculare, loculis 1-ovulatis, ovulis pendulis anatropis.

HAB. Pokupokusha, leg. U. MORI, Juli. 1912, Fl. ♀.

Nothing like this in Chino-Japanese flora. Somewhat near *I. organiensis* LOES. Monog. t. IV. fig. 3, in appearance.

**Ilex Maximowiczii** LOES. Monogr. Aquifoliac. p. 339.

HAB. Liukiu: Yaeyama.

**Ilex micrococca** MAXIM. var. **longifolia** HAYATA n. v. (Tab. IX.)

Rami veteriores glabri cinerascetes longitudinaliter rugosi lenticellati (lenticellis rotundatis utraque extremitatem cuspidatis), ramulis novellis fusco-rubrescentibus longitudinaliter rugosis glabris nitidis lenticellatis. Folia alterna, ovato-oblonga, oblongo-lanceolata, 10-12 cm. longa, 3-4 cm. lata, apice longe acuminata, basi cuneato-acuta, obtusa, nunquam rotundata, chartacea, supra nitida subtus pallida, in exsiccato supra fulvo-rubrescentia subtus fulvo-flavescentia, (costis et venis rubescente-coloratis, costis supra impressis sulcatis subtus elevatis, venis lateralibus supra tenuissime elevatis subtus distincte elevatis, venulis supra reticulatis tenuiter elevatis), margine tenuiter remote serrulata, serrulis longe aristatis, petiolis gracillimis recurvo-reflexis fusco-rubrescentibus in exsiccato valde rugulosis intus sulcatis laminam  $\frac{1}{3}$ -plo æquantibus. Cymæ axillares solitariae, pedunculis 1 cm. longis apice ramosissimis, ramis bis terque umbellatis, pedicellis ultimis angulatis glabris rubrescentibus 5 mm. longis basi ad ramificationem bracteatis, bracteis cuspidato-triangularibus  $\frac{1}{2}$  mm. longis. Calyx patens 2 mm. in diametro 7-9-lobatus, lobis late cuspidiformibus  $\frac{2}{3}$  mm. latis  $\frac{1}{2}$  mm. longis acutis, sub-denticulatis  $\pm$  sulcatis. Fructus præmaturi globosi.

HAB. Uraisha, leg. N. KONISHI, Aug. 1906.

Differs from the type by the much narrower leaves with acute or obtuse base which is never rounded as is the case with the type.

**Ilex trichoclada** HAYATA sp. nov. Rami recti veteriores, cortice fusco-cinerascenti tenuiter longitudinaliter rugos, fusco-pubescentes non lenticellati, novelli fulvo-villosi, pilis brevissimis densis rectis. Folia oblongo-elliptica, elongato-oblonga,  $3\frac{1}{2}$  cm. longa 12 mm. lata, apice acuta vel subacuminata, ad summum aristato-acuta, basi cuneato-acuta, chartacea, supra prope costam pubescentia caeterem glabra, subtus tenuiter pubescentia ad costas dense pubescentia, costis supra tenuissime sulcatis elevatis, venis lateralibus primariis utroque latere 5-6 tenuissimis utraque pagine distinctis rectis prope marginem recurvatis eam proximam superiorem attingentibus, margine plana nunquam recurva remote serrulata a medio deorsum integra, serrulis apice aristatis, petiolis brevissimis 2 mm. longis dense fulvo-pilosis intus sulcatis. Fructus ad axillas subfasciculati, pedicellis 3 mm. longis breve hirsutis basi bracteis 2-3 instructis. Calyces fructiferi 6-lobati, lobis patentibus tenuibus triangularibus  $\frac{2}{3}$  mm. longis obtusis margine denticulatis. Fructus globosi rubescentes in exsiccato subsulcati, stigmate persistenti subconico.

HAB. Fokien: Ysan, Nov. 1909, leg. S. NAGASAWA, (No. 97).; Kelung: Taiheishō, leg. Y. SHIMADA, Dec. 1908, (Fr.).

Near *I. yunnanensis* FRANCH., but differs from it by the much thinner and smaller leaves and 6-merous calyx.

**Ilex Warburgii** L'ES. Monogr. Aquifoliac. p. 326.

## Celastrineæ.

### *Euonymus* LINN.

**Euonymus acutorhombifolia** HAYATA sp. nov. Ramuli ultimi tetragoni, ad angulos angustissime alati, subpallidi. Folia opposita rhomboideo-oblonga, apice breve acuminata basi subito recto-cuneata, ad extremitatem attenuata,  $8\frac{1}{2}$  cm. longa, 4 cm. lata, chartaceo-coriacea, supra nitida, in exsiccato

supra pallida subtus pallidissima, costis et venis utraque pagine distincte elevatis ~formiter recurvis, venis primariis lateralibus utroque latere 4, a medio sursum serrata deorsum subintegra ad marginem leviter recurva subsessilia vel petiolis brevissimis 1-2 mm. longis. Flores 1-2 subfasciculati vel breve paucisque racemosi, bracteis lanceolato-triangularibus crassiusculis margine rubro-ciliolatis, pedicellis 1-1½ cm. longis. Sepala 4, late rotundata, denticulato-ciliolata. Petala 4 late rotundata, margine denticulato-ciliolata. Stamina 4, antheris late reniformibus 1½ mm. latis  $\frac{2}{3}$  mm. longis subsessilibus ad apicem dentium disci siti, filamentis brevissimis vel 0. Discus concavus, rectangulari-formis remote obscure 4-dentatus, dentibus remotis latissimis. Ovarium vix elevatum vel subplanum, stylo brevissimo.

HAB. Montibus maritimis Formosæ, ad 4000 ped. alt., leg. Y. FURUKAWA, Mart. 1910.

**Euonymus pallidifolia** HAYATA sp. nov. Ramuli recti albo-flavescentes vel pallidissimi, teretes, nec rugosi nec lenticellati, cortice albo-flavescenti, foliati. Folia in exsiccatō albo-flavescentia, pallidissima, concolora, opposita, oblonga, rotundato-oblonga coriacea, apice acuta vel obtusa sed ad extremitatem semper obtusa vel leviter retusa, basi rotundata acuta rotundato-obtusa, supra utraque pagine glabra, costis supra acuto-elevatis subtus minus elevatis vel obtuso-elevatis, venis lateralibus primariis supra tenuissime elevatis subtus non visis vel minus elevatis utroque latere 5-6 rectis angulo 50°-60° a costa egressis, margine integerrima angustissime arete desuper recurva marginata, petiolis brevissimis 5 mm. longis  $\frac{1}{10}$ -plo laminam æquantibus. Flores non visi. Pedunculi fructiferi axillares solitarii 3½ cm. longi erecti. Capsula depresso-globosa, 1½ cm. in diametro 7 mm. longa, rubro-flavescens, 3-valvatim dehiscens, valvis lignoso-coriaceis, 3-locularis, loculis 1-spermis. Semina quadrantiformia 8 mm. longa inæqualiter 3-4 striata apice arillis rubris coronata.

HAB. Kōshun, leg. NISHIGAKI, Jan. 1910.

**Euonymus pellucidifolia** HAYATA sp. nov. (Tab. X.) Frutex 3-4 m. alta recta, ramis et ramulis subviridescentibus subgracilibus rectis longitudinaliter sulcatis non lenticellatis glabris. Folia opposita, glaberrima,

oblonga, oblongo-lanceolata vel lanceolata, apice acuminato-cuspidata, basi cuneato-attenuata, 10-13 cm. longa 4 cm.-2½ cm. lata, chartaceo-membranacea vel chartacea, pellucida, supra nitida in exsiccato pallida, concolora, (costis utraque pagine elevatis distinctis, venis lateralibus primariis supra tenuiter distincte elevatis subtus non distinctis vix visis utroque latere 4-5 remotis, ~ formiter recurvis), margine remote serrulata, (serrulis subobtusis) deorsum integra, petiolis  $\frac{1}{10}$ - $\frac{1}{12}$ -plo laminam æquantibus 10-7 mm. longis intus profunde sulcatis extus transversim rugosis. Cymæ axillares solitariae vel 3-4-fasciculatae ad ramulos brevissimos sitæ 2-3 cm. longæ paucissime dichotome floriferae, ad ramificationem bracteatae, bracteis minutis deciduis, pedicellis 7-8 mm. longis medio articulatis. Flores patentes 7 mm. in diametro. Sepala 5 late orbicularia patentia in magnitudine inæqualia, minoribus 1½ mm. latis majoribus 2½ mm. latis, margine rubro-ciliolata. Petala 5, inæqualia late rotundata, (majoribus 3 mm. longis 3½ mm. latis), rubescentia margine minute denticulata, basi contracta ½-1 mm. lata. Stamina 5 ad discum sita, filamentis brevissimis vix 0, antheris reniformibus ¾ mm. latis ½ mm. longis, loculis divaricatis ad apicem connectivorum oblique vel transversim sitis albis, connectivis incrassatis minute rubro-punctatis. Discus subplanus rotundatus, 2½ mm. in diametro, leviter 5-lobatus. Ovarium in disco subimmersum late conicum 5-loculare, loculis 1-ovulatis, ovulis erectis, stylo brevissimo.

HAB. Suisha, ad 2000 ped. alt., leg. B. HAYATA et S. SASAKI Mai. 27, 1912.

*Euonymus Dielsiana* HAYATA (non LÆSNER) in Mater. Fl. Formos. p. 58.

The present plant is certainly near *E. Dielsiana* LÆS. from which it is distinguishable in having 5-merous flowers. It is collected by Mr. S. SASAKI and myself in my last excursion to the island in a forest by Suisha-lake on an altitude of nearly 2000 ft. The tree is very well known among savages, on account of its superior quality for making a kind of bow.

### *Celastrus* LINN.

***Celastrus oblongifolia*** HAYATA sp. nov. Scandens ramis teretibus longitudinaliter rugulosis lenticellatis, lenticellis rotundatis, glabris.

Folia chartacea, ovato-oblonga vel ovato-elliptica apice acuminata, basi rotundato-obtusa vel rotundata, 10 cm. longa 4 cm. lata, margine remote mucronato-serrulata, (mucronibus a se 4 mm. remotis), nigricantia, costis supra tenuiter elevatis subtus valde elevatis, venis supra tenuiter subtus distincte elevatis, venis lateralibus primariis utroque latere 6, costis subtus breve hirsutis vel subglabratiss, venis arcuatis, petiolis 12 mm. longis  $\frac{1}{10}$ -plo laminam æquantibus. Flores non visi. Capsula paniculata, (pedicellis 1 cm. longis) 3-valvatim dehiscens, ovata, apice apiculata, valvis lignoso-coriaceis. Semina subquadrantiformia interiore recurvata, arillis rubris.

HAB. Arisan, Jan. 1912, leg. B. HAYATA et S. SASAKI.

Near *C. articulatus*, but differs from it in having much longer narrower leaves.

### *Gymnosporia* W. et A.

***Gymnosporia trilocularis*** HAYATA sp. nov. Rami subrecti teretes, cortice cinerascenti longitudinaliter sulcato-ruguloso. Folia ad ramulos brevissimos laterales ternatim sita, obovata vel obovato-cuneata, 5 cm. longa 33 mm. lata, coriacea, apice rotundata, basi cuneata, in exsiccato remote crenata, ad sinus crenarum nigro-mucronato-punctata, costis supra distincte costatis, subtus elevatis, venis lateralibus supra tenuissime subtus distincte elevatis grosse reticulatis, petiolis 4 mm. longis circ.  $\frac{1}{10}$ -plo laminam æquantibus supra utroque latere subalatis sulcatis. Cymæ ad apicem ramorum brevissimorum lateralium fasciculatæ. Flores non visi. Cymæ fructiferæ 3 cm. longæ, pedicellis 1 cm. longis. Capsula trilocularis, valvis late rotundatis 5 mm. longis apice mucronatis. Semina oblonga, 3 mm. longa, 2 mm. lata, testa nitida fusco-rubescenti, basi arillata.

HAB. Kōtōshō: litore occidentali, leg. K. MIYAKE, Nov. 1899.

*Celastrus trilocularis* HAYATA in Herb. Mus. Taihoku.

The present plant is near *G. diversifolium* MAXIM., from which this is distinguishable by the larger leaves and trilocular capsules.

*Cassine* LINN.

***Cassine illiciifolia*** HAYATA sp. nov. (Tab. XI.) Frutex? Rami et ramuli subgraciles, longitudinaliter rugulosi, lenticellati, ramulis ultimis (cortice subfusco-rubescenti) glabris longitudinaliter subalatis sulcato-rugulosis cicatricibus foliorum semi-oblongis notatis. Folia opposita ovata obovato-lanceolata, apice acuta acuminata, ad summum obtusa, basi cuneata, acuminata, gradatim ad petiolum abeuntia, circ. 7 cm. longa  $2\frac{1}{2}$ -3 cm. lata chartacea vel tenuiter coriacea vel membranaceo-coriacea, in exsiccato supra pallida, nitida, subtus albo-pallidissima, costis supra distincte graciliter elevatis subtus planis non distinctis, venis lateralibus primariis tenuissimis distinctis utroque latere 7-8 subrectis angulo  $40^{\circ}$ - $50^{\circ}$  a costa egressis subtus non distinctis, margine integerrima, petiolis  $\frac{1}{10}$ -plo laminam æquantibus subalatis subplicatis 7 mm. longis glabris. Flores breve cymosi vel solitarii, cymis axillaribus dichotome ramosis paucifloratis, pedicellis 3 mm. longis apice 2-bracteatis, bracteis rotundato-triangularibus 1 mm. longis subacutis margine rubro-denticulatis. Calyx obconicus, lobis 4 decussatim imbricatis late rotundatis 1 mm. longis 2 mm. latis, margine fimbriato-albo-vel-rubro-ciliatis pagine glabris. Petala 4 calycis lobis alterna, ad faucem calycis affixa ovato-oblonga 2 mm. longa  $1\frac{1}{2}$  mm. lata crassiuscula apice obtusa denticulata exteriore reflexa, basi contracta  $\frac{1}{2}$  mm. lata, latere margine integra, intus convexa extus concava. Stamina 4, ad faucem calycis affixa, filamentis validiusculis rectis, antheris reniformibus versatilibus introrsum dehiscentibus. Discus subcampanulatus calycis tubo adnatus, apice 4-lobatus, lobis liberis cum stamine alternis late liguliformibus  $\frac{2}{3}$  mm. latis  $\frac{1}{3}$  mm. longis. Rudimentum ovarii (vel ovarium?) subconicum brevissimum 2-loculare, loculis 1-ovulatis, stylo breve columnari cum ovariis  $1\frac{1}{2}$  mm. longo tenuiter 4-sulcato. Capsula obovoideo-cylindrica 13 mm. longa 5 mm. lata, pericarpio coriaceo, 1-sperma. Semina obovoidea 12 mm. longa, testa rubra.

*Otherodendron illiciifolium*\* HAYATA in Sched. (Herb. Taihoku Museum.)

\* The genus *Otherodendron* MAKINO, to which the present plant with the following two species was provisionally referred, is separated from *Cassine* LINN. in having a dehiscent capsule. The fruit of the former has very similar structure as that of the latter which has sometimes 1 or 2 seeds within a hard coriaceous pericarp.

HAB. Arisan, ad 7500 ped. alt., leg. S. SASAKI, Mart. 1911. (Fl. ♂); Taito: Takukeisha, leg. U. MORI, Dec. 1906. (Fr. ♀).

The male flowers are very like those of *C. japonicus*, but differs from them by the much smaller form. Fruits are also much smaller than those of the Japanese species.

**Cassine kotœnsis** HAYATA sp. nov. Frutex. Rami et ramuli recti, cortice longitudinaliter ruguloso, ramulis longitudinaliter sulcato-rugulosis rubescentibus. Folia opposita, obovata, rotundato-oblonga, rhomboideo-oblonga, apice acuta breve cuspidata ad summum obtusa, basi cuneato-acuta ad extremitatem subito attenuata ad petiolum abeuntia, chartacea vel tenuiter coriacea, pallida vel viridescens, costis utraque pagine elevatis distinctis, venis lateralibus primariis utroque latere 5-6 rectis vel ~formiter curvatis utraque pagine tenuissime elevatis, venulis supra interdum inconspicuo-reticulatis, margine integerrima, petiolis 8 mm. longis interiore plicato-sulcatis laminam  $\frac{1}{10}$ -plo æquantibus. Flores cymosi, cymis axillaribus solitariis dichotome ramosis, pedunculis 1 cm. longis. Flores maturi non visi.

*Elæodendron japonicum* HAYATA, (non FR. et SAV.) in MATSUM. et HAYATA Enum. Pl. Formos. p. 84; *Otherodendron kotœnse* HAYATA in Sched. (Herb. Mus. Taihoku.)

HAB. Kōtōshō, leg. K. MIYAKE, Nov. 1899.

**Cassine micrantha** HAYATA sp. nov. Ramuli graciles, recti, divaricati, cortice fusco-rubescens, glabri longitudinaliter rugosi. Folia rhomboideo-oblonga vel obovato- vel ovato-oblonga, apice cuspidato-acuta, basi late cuneata vel subito acuta ad extremitatem breve attenuata, 9-10 cm. longa 5-5½ cm. lata, membranaceo-chartacea vel chartacea, in exsiccato costis utraque pagine elevatis, venis lateralibus primariis utroque latere 7-8 rectis vel ~formiter recurvis supra tenuissime et distincte elevatis subtus minus distinctis, venulis supra minute reticulatis subtus minus distinctis, in exsiccato utraque pagine pallida, margine integra, petiolis  $\frac{3}{4}$  cm. longis interiore sulcato-plicatis laminam  $\frac{1}{10}$ -plo æquantibus. Flores cymosi, cymis axillaribus solitariis 5-6-floratis dichotome-floriferis, pedunculis 4 mm. longis, pedicellis

1-2 mm. longis apice 2-bracteis instructis, bracteis triangularibus  $1\frac{1}{2}$  mm. longis acutis dorso acuto-angulatis margine rubro-ciliatis; flores sub calyce cum pedicellis articulati. Flores maturi non visi.

HAB. Byōritsu: Shinsuiye, leg. T. KAWAKAMI, Oct. 1908, (No. 7192).

## Rhamneæ.

### *Rhamnus* LINN.

**Rhamnus acuminatifolia** HAYATA sp. nov. Rami, cortice cinerascenti longitudinaliter lenticellato et rimis longitudinalibus fisso. Folia alterna oblongo-lanceolata vel obovato-lanceolata, maxima 13 cm. longa  $4\frac{1}{2}$  cm. lata, tenuiter chartacea, apice acuminata vel cuspidato-acuminata basi cuneato-obtusa vel acuta, margine minute serrulata prope basin integra, supra ad costam sulcata, subtus costis elevatis, venis lateralibus primariis supra tenuissime impressis vel non impressis subtus distincte elevatis rectis prope marginem subito arcuato-ascendentibus eam superiorem proximam attingentibus  $30^{\circ}$ - $40^{\circ}$  a costa divaricatis, venulis transversis tenuissimis, utraque pagine glabra, petiolis laminam  $\frac{1}{10}$ -plo æquantibus 12 mm. longis hirsutis intus sulcatis teretibus. Flores umbellati, umbellis pedunculatis, pedunculis pedicello brevioribus solitariis axillaribus hirsutis. Calyx hirsutus, lobis triangularibus acutis. Flores apertientes non visi.

HAB. Nantō: Rokujōdaisan, leg. U. MORI, 1908, Aug. Fr. (No. 1156); Ritōzan, leg. T. KAWAKAMI, Juli. 1913.

Differs from *R. crenata* S. et Z. by the much more acuminate and narrower leaves.

### **Rhamnus japonica** MAXIM. var. **decipiens** MAXIM.

HAB. Fōkien: Usekisan, Oct. 1910, leg. S. NAGASAWA.

Compared with a specimen of this variety in the Tōkyō Herbarium.

### **Rhamnus nepalensis** LOUR. Cult.

### **Rhamnus Sieboldiana** MAKINO in Tōkyō Bot. Mag. XXVI, p. 392.



HAB. Fokien : Seizengi (cult. ?), leg. S. NAGASAWA, Aug. 1910.

Compared with a specimen of this species in the Tōkyō Herbarium.

## Ampelideæ.

### *Cissus* LINN.

***Cissus pteroclada* HAYATA** (Tab. XII.) Ic. Pl. Formos. II. p. 107.

Descriptio auctata: Calyx late campanulatus,  $1\frac{1}{2}$  mm. longus,  $2\frac{1}{2}$  mm. latus, apice truncatus. Petala conduplicato-valvata, elongato-triangularia  $2\frac{1}{2}$  mm. longa, basi  $1\frac{1}{2}$  mm. lata, basi tenuia, apice crassiuscula cuculliformia, erecta. Stamina 4 cum petalis opposita 2 mm. longa, filamentis  $1\frac{1}{2}$  mm. longis, antheris ovoideis  $\frac{1}{2}$  mm. longis, connectivis incrassatis. Ovarium subconicum apice acutum ad stylum brevem abeuns, stylo brevissimo 1 mm. longo, stigmate oblique terminali.

### *Vitis* LINN.

***Vitis leucocarpa* HAYATA** sp. nov. Caulis subteres glaber, longitudinaliter minute multi-sulcatus. Folia pedatim 5-foliolata, foliolo terminali petiolulato lanceolato apice acuminato basi obtuso vel acuto, petiolulis lateralibus angulo recto divaricatis apice furcatim ramosis foliolos laterales gerentibus, foliolis lateralibus oblique oblongis acutis minoribus omnibus serratis, (serris apiculatis), prope basin subintegris, petiolis communibus lamina folioli terminalis æquilongis gracilibus. Fructus baccati albicantes depresso globosi, 6-7 mm. in diametro. Semina 5, quadrantiformia, testa dura dorso transverse rugosa.

HAB. Suisha, Mai. 1912, leg. S. SASAKI et B. HAYATA.

This is very near *V. japonica* and *V. corniculata*; but differs from them by the much smaller leaves and white fruits.

***Vitis umbellata* HEMSL. var. *arisanensis* HAYATA** n. v. Caulis gracilis teres glaber vel hirsutus, ramis et ramulis valde divaricatis. Folia digitatim 5-foliolata in ambitu cordata, foliolo terminali magno sublanceolato vel

ovato-lanceolato 3-5 cm. longo 1½ cm. lato acuto vel acuminato basi acuminato-cuneato apice ad summum calloso-aristato membranaceo vel membranaceo chartaceo supra glabro viridissimo subtus glabro pallidiore, (costis supra acute elevatis subtus obtuse elevatis, venis lateralibus utroque latere 4-5 supra non elevatis subtus tenuiter impressis et distinctis), margine utroque latere dentibus ascendentibus 5-6 (dentibus apice obtusis aristatis callosis), foliolis lateralibus obliquis minoribus, eis basilaribus minimis sessilibus, petiolis communibus gracilibus glabris vel tenuiter hirsutis foliolo terminali æquilongis vel longioribus, stipulis majusculis latis oblique oblongo-triangularibus 3 mm. longis apice obtusis scariosis margine minute ciliolato-denticulatis cum eis oppositis caulem amplexantibus, cirrhis oppositifoliis multiramosis. Fructus umbellati, umbellis pedunculatis, pedunculis 3 cm. longis, a medio deorsum 6-4-bracteis instructis, bracteis oppositis stipula conformibus, pedicellis (radiis) 1½ cm. longis. Fructus baccati, globosi 1-2-spermi. Semina rotundata plano-convexa 4-5 mm. in diametro, facie et dorso vermiforme rugulosa.

HAB. Mt. Arisan, leg. B. HAYATA et S. SASAKI, Jan. 1912.

Differs from the type by the much smaller and narrower leaves.

## Sapindaceæ.

### *Kœlreuteria* LAM.

***Kœlreuteria formosana*** HAYATA (Tab. XIII.) Folia bipinnata obovata, 40-50 cm. longa, 30 cm. lata, pinnis 9-11; pinnis infimis minimis a basi petioli 8 cm. distantibus 5-foliolatis, foliolo terminali ovato-acuminato 6 cm. longo 3 cm. lato basi obtuso apice cuspidato-acuminato supra nitido subtus pallidiore margine subintegro vel pauci-serrato, costis supra tenuiter elevatis subtus prominentibus, venis lateralibus tenuibus subtus elevatis prominentibus, foliolis lateralibus lanceolatis terminali minoribus angustioribus basi obliquis, petiolulis 2 mm. longis; pinnis mediis majoribus 20 cm. longis 13 cm. latis 9-11 foliolatis, foliolo terminali majore, lateralibus obliquis acuminatis pauciserratis; petiolis communibus cum rhachidibus 40 cm. longis,

lenticellis rotundatis notatis glabris longitudinaliter rugosis basi incrassatis. Capsula vesicularis, inflata, 3-lobata, loculicide 3-valvata, valvis membranaceis reticulato-nervosis rotundatis  $4\frac{1}{2}$  cm. longis 4 cm. latis margine tenuiter marginatis, septis seminiferis. Semina subglobosa nigra exarillata, testa crustacea nigra; embryo spiraliter convolutus.

HAB. Tappansha, leg. U. MORI, Oct. 1906, (No. 1736).

Near *Kalreuteria bipinnata* FRANCH., but differs from it in having subentire leaflets.

### *Acer* LINN.

***Acer* (*Integrifolia*) *cinnamomifolium* HAYATA sp. nov. (Tab. XIV.-A.)**

Rami recti, cortice fusco-rubescenti, longitudinaliter rugosi, lenticellis parvis tenuiter elevatis medio 1-sulcatis, ramulis hornotinis basi dense mollissime tomentosis perulis multiseriatis instructis, perulis scariosis extimis minoribus triangularibus 2 mm. longis obtusis convexis, intimis longissimis 1 cm. longis sublinearibus molle tomentosis. Folia ad apicem ramulorum opposita sita, lamina ampla membranacea vel membranaceo-chartacea, elliptica vel oblonga vel ovato-elliptica 11-12 cm. longa  $4\frac{1}{2}$ -5 cm. lata, apice breve cuspidata ad summum obtusa basi obtusissima vel subrotundata, margine integra vel grosse obscure undulata, supra glaberrima vel ad costas tomentosa, subtus tenuissime dense mollissimeque tomentosa, albicantia, supra in exsiccatō fulvescentia, costis et venis rubescentibus utraque pagine tenuissime elevatis, venulis secundariis supra minute tenuissime elevato-reticulatis, distincte trinervia, nervis lateralibus latere inferiore plus ramosis, nervo centrali pauci-ramoso utroque latere venulas 2-3 emittenti, petiolis gracilibus  $\frac{1}{3}$ -plo laminam æquantibus supra sulcatis subteretibus basi tomentosis. Cymæ ad ramulos terminales, 6 cm. longæ totiusque latæ, rhachidibus pedicellisque dense albo-tomentosis, pedicellis gracilibus 3 cm. longis erectis. Sepala 4-5 linearia, 2-4 mm. longa,  $\frac{2}{3}$  mm. lata, apice obtusa, extus hirsuta, intus glabra, patentia. Petala 4-5, linearia vel lineari-spathulata, apice obtusa, basi angustata, 3-4 mm. longa, 1 mm. lata, utraque pagine glabra. Discus extrastaminalis, 8-10-partitus, segmentis latis subglobosis  $\frac{2}{3}$  mm. latis. Stamina 8-10, filamentis  $1\frac{1}{2}$  mm.

longis glabris, antheris oblongis 1 mm. longis emarginatis vel apiculatis. Ovarium dense hirsutum late obtriangulare 2 mm. latum  $1\frac{1}{2}$  mm. longum, stylo prope basin 2-fido, ramis patento-recurvatis  $1\frac{1}{2}$ –2 mm. longis.

HAB. Fokien: Kosan, leg. S. NAGASAWA.

Very interesting species, remarkable for its trinerved leaves which are covered by very thin soft tomentum. It is certainly a species referable to the section *Integrifolia* PAX.

**Acer** (*Integrifolia*) **hypoleucum** HAYATA sp. nov. (Tab. XIV.-C.)

Rami subrecti, longitudinaliter leviter rugulosi, lenticellis longitudinaliter notati, lenticellis medio sulcatis, cortice fuscenti, ramulis ultimis molle tomentoso-pubescentibus. Folia opposita oblonga vel elliptica apice obtusissima interdum ad summum retusa vel non retusa, basi rotundata vel obtusa, circ. 8 cm. longa  $3\frac{1}{2}$ –4 cm. lata, chartaceo-coriacea, margine integra vel leviter undulata, supra glabra, in exsiccatō fulvo-rubescens, subtus glaucissima albicantia leviter albo-purpurascens tenuissime molleque tomentosa, costis supra tenuiter elevatis vel non elevatis rubescentibus subtus prominente elevatis, venis lateralibus primariis utroque latere 5 subrectis vel medio sursum subreflexis angulo  $50^{\circ}$ – $60^{\circ}$  a costa egressis, petiolis subgracilibus 2 cm. longis laminam  $\frac{1}{4}$ -plo in longitudine æquantibus supra tenuiter sulcatis basi leviter incrassatis. Flores non visi. Cymæ fructiferæ ad ramos laterales terminales, 5 cm. longæ 7 cm. latæ, rachidibus et pedicellis pubescentibus, pedicellis gracilibus  $1\frac{1}{2}$  cm. longis. Carpelli loculi valde prominentes facie grosse reticulato-striati glabri superne (apice) impressi; alæ cum loculis 17 mm. longæ 6 mm. latæ angulo  $80^{\circ}$  a se divaricatæ.

HAB. Baatankei, leg. U. MORI, Juli. 1912.

Near *A. neivium* BLUME, *A. oblongum* WALL. and *A. lanceolatum* MOLLIARD; but differs from the first by the quite obtuse leaves which are whitish on the underside, from the second by the quite obtuse oblong leaves thinly covered by very soft wools and from the last by the oblong elliptic leaves.

**Acer** (*Integrifolia*) **litseæfolium** HAYATA sp. nov. (Tab. XIV.-B.)

Rami et ramuli glabri, cortice fuscenti lenticellis minutis notato. Folia

oblanceolata, chartacea, vel chartaceo-coriacea, 10 cm. longa 23 mm. lata, apice acuminata ad summum obtusissima, basi acuta vel cuneata, supra glabra, subtus glauca, costis et venis supra planis subtus prominentibus, venis primariis lateralibus utroque latere 8-10, venulis subtus transverse reticulatis, petiolis  $\frac{1}{4}$ -plo laminam in longitudine æquantibus circ.  $2\frac{1}{2}$  cm. longis intus sulcatis basi incrassatis. Cymæ fructiferæ ad ramos terminales, 4 cm. longæ 5 cm. latæ, rhachidibus et pedicellis glabris, pedicellis 1 cm. longis vel longioribus. Carpelli alæ semi-oblongæ angulo  $70^\circ$  a se divaricatæ, cum loculis 2 cm. longæ, loculis subglabris.

HAB. Montibus prope Nantō, leg. Z. ŌHASHI.

Somewhat like *A. oblongum* WALL., but differs in its oblanceolate leaves.

**Acer** (*Indivisa*) **taiton-montanum** HAYATA sp. nov. Rami graciles, subrecti, toto glabri non lenticellati, sublaeves, fusco-rubrescentes. Folia triangulari-cordata, membranacea vel membranaceo-chartacea, 6 cm. longa 5 cm. lata, apice triangulari-acuminata, basi profunde cordata, elobata vel subtrilobata, margine duplicato-serrulata, glaberrima, trinervia, nervis et venis tenuissimis et distinctis subplanis vel leviter elevatis, nervis lateralibus angulo  $50^\circ$  a eo centrali divaricatis, venis lateralibus nervi centralis utroque latere 7-8, 7 mm. a se remotis rectis angulo  $40^\circ$  a costa divaricatis, petiolis 2 cm. longis  $\frac{1}{3}$ -plo laminam in longitudine æquantibus intus late sulcatis basi haud incrassatis. Racemi fructiferi subterminales subpenduli; carpelli alæ oblongæ cum loculis 27 mm. longæ 7-8 mm. latæ apice obtusæ angulo  $100^\circ$  a se divaricatæ; loculi nervati.

HAB. In monte Taiton, leg. U. FAURIE, Mai. 1903.

This differs from *A. insulare* in having cordately based leaves, from *A. laxiflorum* in the shorter caudate leaves, from *A. cratægifolium* in the thinner cordate leaves, and finally from *A. Kawakamii* and *A. morrisonense* by the longer winged carpels.

### **Euscaphis** SEEB. et ZUCC.

**Euscaphis Konishii** HAYATA sp. nov. Rami teretes, cortice glabro cinereo-fusco-marmorato longitudinaliter fisso. Folia opposita impari-pinnata

in ambitu ovata cum foliolis 10 cm. longa 6-7 cm. lata, foliolis sæpe 5 obovatis 4 cm. longis  $2\frac{1}{2}$  cm. latis chartaceis apice cuspidato-acutis basi cuneato-acutis margine crenulatis ad apicem crenarum apiculatis, (costis utraque pagine elevatis venis lateralibus tenuissime elevatis), in exsiccato supra fuscentibus subtus pallidis vel pallidissimis. Flores ignoti. Carpella 4, divaricata, stipitata, ovata, apice late breveque rostrata, cum stipitibus 1 cm. longa 5 mm. lata. Semina compresso-subglobosa in arillis inclusa, 6 mm. longa 5 mm. lata.

HAB. Hainan, leg. N. KONISHI, 1909.

Differs from *E. japonica* by the shortly stalked carpels and by the crenulate leaves. It is named after the lamented N. KONISHI, in commemoration of his great botanical services. The plant was collected by him in the summer of the year 1909 in the island of Hainan, where he was taken with a fatal fever. After coming back to Taihoku, he died much to the sorrow of the present writer and to a great loss to the botanical world.

## Sabiaceæ.

### *Meliosma* BLUME.

***Meliosma callicarpæfolia*** HAYATA sp. nov. Rami et ramuli graciles longitudinaliter rugosi, hornotini dense rubro-ferrugineo-pubescentes. Folia alterna chartacea vel membranaceo-chartacea, oblanceolata, obovato-lanceolata, 10-15 cm. longa, 3-4 cm. lata, apice acuminata vel caudato-acuminata, basi cuneata, cuneato-attenuata, margine subintegra vel repanda, utraque pagine glabra, supra ad costas elevatas hirsuta, subtus ad axillas venarum hirsuta, costis infra elevatis, venis lateralibus supra tenuiter subtus prominente elevatis, venis secundariis supra tenuiter subtus prominente reticulatis, basi gradatim attenuata ad petiolum abeuntia, petiolis 2-3 cm. longis gracilibus supra superiore alatis hirsutis basi incrassatis, partibus incrassatis 4 mm. longis. Paniculæ terminales 10-13 cm. longæ 7-8 cm. latæ graciles ramosæ, ramis ramulisque gracillimis dense fusco-pubescentibus, floribus spicatum gerentibus, pedicellis ultimis  $\frac{1}{2}$  mm. longis basi bractea una instructis, bracteis

ovatis acuminatis  $\frac{1}{2}$  mm. longis ciliolatis, ciliis setulosis. Alabastrum floris minutum; sepala 4 late orbiculata 1 mm. lata  $\frac{2}{3}$  mm. longa. Flores apertientes non visi.

HAB. Baantankei, leg. U. MORI, Juli. 1912; Arisan, leg. UYEMATSU, Jan. 1913.

**Meliosma** sp. nov.? aff. **sumatrana** MIQ.

HAB. Kōtōshō.

## Leguminosæ.

### *Indigofera* LINN.

**Indigofera kotœnsis** HAYATA in Mater. Fl. Formos. p. 75. Descriptio auctata. Racemi fructiferi 5–10 cm. longi, profuse fructus gerentes. Legumina linearia 3 cm. longa  $\frac{1}{2}$  cm. lata, subcomplanata, apice breve rostrata, basi obtusa, facie paucissime pubescentia, subrecta vel  $\pm$  recurva, fusco-nigricantia.

HAB. Garambi, Mai. 1912, leg. B. HAYATA.

### *Desmodium* DESV.

**Desmodium dispernum** HAYATA sp. nov. Rami recti, lenticellis globosis minutis, cortice longitudinaliter soluto, ramulis novellis albo-hirsutis gracilibus rectis. Folia 3-foliolata, foliolo terminali obovato circ. 2 cm. longo 13 mm. lato apice rotundato emarginato minutissime mucronato basi cuneato obtuso supra (in exsiccato) fusco-nigricanti subglabro subtus pallido adpresse hispidulo ad costas et venas hirsuto, supra costis venisque planis subtus tenuiter elevatis, venis lateralibus primariis utroque latere 7–8 parallelis distinctis venulis minutissime obscure reticulatis inconspicuis, petiolulo  $1\frac{1}{2}$  mm. longo, foliolis lateralibus eo terminali conformibus  $\pm$  minoribus, stipellis setiformibus 1 mm. longis, rhachidibus (inter petiolulum terminalem et petiolum) 3 mm. longis, petiolis 7 mm. longis cum rhachidibus supra sulcatis hirsutis, stipulis lineari-lanceolatis 4 mm. longis 1 mm. latis extus hirsutis intus glabris. Cymæ axillares uni- vel pauci-floratae, pedunculis 8 mm. longis, pedicellis 3–4 mm. longis, bracteolis 2 basi calycis dispositis ovatis  $2\frac{1}{2}$  mm.

longis apice acuminatis multinerviis extus hirsutis intus glabris. Calyx fuscens extus albo-pubescent, campanulatus, 4 mm. longus, lobo postico (lobis posticis 2 connatis) oblongo-triangulari 2 mm. longo totiusque lato apice cuspidato, cuspidibus 1 mm. longis, lobis lateralibus triangularibus 2 mm. longis acuminatis lobo antico ovato-triangulari 4 mm. longo apice acuminato. Vexillum obcordatum 1 cm. longum 8 mm. latum apice rotundato-2-lobatum (lobis 1 mm. longis), basi cuneato-acutum, ad insertionem  $\frac{1}{2}$  mm. latum; alis obovato-oblongis unguiculatis, laminis obovatis 7 mm. longis 3 mm. latis basi latere superiore auriculatis, unguibus 2 mm. longis; carinis unguiculatis, laminis semi-oblongis 8 mm. longis  $3\frac{1}{2}$  mm. latis apice obtusis basi ad unguem abeuntibus latere superiore rectis latere inferiore rotundatis, gibboso-inflatis, unguibus linearibus 3 mm. longis. Stamina monadelpha tubo filamentorum 6-7 mm. longo, partibus liberis 5 mm. longis. Ovarium lineare 2 mm. longum hirsutum, stylo filiformi medio vel infra medium hirsuto sursum glabro ad medium angulo recto flexo, stigmate punctiformi. Legumen valde complanatum medio constrictum di-spermum, articulis 2 a se solutis oblongis 8 mm. longis 5 mm. latis facie reticulatis adpresse hirsutis.

HAB. Formosa: Loco non indicato.

Near *D. umbellatum* DC., but differs from it by the 2-seeded pods.

### *Uraria* DESV.

***Uraria latisepala*** HAYATA sp. nov. Suffrutex, caulis rectus, teres, leviter sulcatus, dense hirsutus vel pilosus. Folia alterna, trifoliata, foliolo terminali magno oblongo elliptico 8 cm. longo 4-4 $\frac{1}{2}$  cm. lato apice obtuso ad summum apiculato (apiculis 1-2 mm. longis) basi cuneato-obtuso integro chartaceo-membranaceo supra tenuiter subtus dense hirsuto, (costis supra tenuissime subtus prominente elevatis, venis primariis lateralibus utroque latere 15 rectis vel sensim recurvis ad marginem attingentibus supra tenuissimis subtus plus distinctis, venulis secundariis inter venas primarias transversim dispositis reticulatis), petiolulis 2 mm. longis teretibus hirsutis, stipellis lanceolatis acuminatis 3-4 mm. longis, rhachidibus 1 $\frac{1}{2}$  cm. longis teretibus sulcatis, foliolis lateralibus eo terminali minoribus id  $\frac{2}{3}$ -plo æquantibus 6 cm. longis 2 $\frac{1}{2}$  cm. latis basi  $\pm$  obliquis rotundato-obtusis, petiolum com-



munibus 2 cm. longis. Racemi 15 cm. longi axillares vel terminales, pedicellis  $\frac{1}{2}$  cm. longis. Calyx fructifer late campanulatus extus strigosus dense pilosus intus glaberrimus, tubo 2 mm. longo limbo 5-lobo, lobo antico longissimo cuspidiformi 6 mm. longo apice acuminato-cuspidato basi 2 mm. lato multinervio, lobis cætris  $\pm$  brevioribus 4 mm. longis oblongis basi 2 mm. latis apice acuminatis. Petala non visa. Fructus spiraliter recurvus, reticulatus.

HAB. Mt. Tōhozan, ad 6500 ped. alt., leg. T. KAWAKAMI et S. SASAKI, Oct. 1909.

Near *U. hamosa*, but differs from it by the much shorter pedicels and much broader lobes.

**Uraria logopoides** DC. in MATSUM. et HAYATA Enum. Pl. Formos. p. 108.

HAB. Yæyama archipelago: Ishigakishima, Juli. 1911, leg. S. KANAGI.

**Uraria picta** DESV.; HAYATA Ic. Pl. Formos. p. 189.

HAB. Takaosan, leg. R. PRICE, (No. 608); Yæyama archipelago: Ishigakishima, leg. S. KANAGI.

### *Lespedeza* MICHX.

**Lespedeza pseudomacrocarpa** HAYATA sp. nov. (Tab. XV.) Frutex glaber, ramosus. Folia pinnatim trifoliolata, pinnis oblongo-obovatis apice rotundato-retusis brevissime mucronatis in exsiccato supra fuscis subtus pallido-glaucis reticulato-venosis, pinna terminali  $3\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  cm. lata, petiolulo 1 cm. longo, lateralibus terminali conformibus sed minoribus  $2\frac{1}{2}$  cm. longis, petiolulis 2 mm. longis, petiolis 2 cm. longis, stipulis subulalis scariosis 4 mm. longis, stipellis obsoletis vel minutis. Flores racemoso-paniculati. Calyces campanulati 5 mm. longi pubescentes, 5-fidi, lobis 2-superioribus connatis, 2-inferioribus linearibus vel subulatis 3 mm. longis. Vexillum obovatum 12 mm. longum 7 mm. latum, apice obtusum basi gradatim angustum. Alæ lineares 12 mm. longæ, (unguibus tenuibus linearibus 3 mm. longis), supra unguem leviter auriculatæ, laminis 9 mm.

longis 4 mm. latis apice obtusis. Carina angustata incurvata rostrata unguiculata, unguibus 3 mm. longis, laminis circ. 10 mm. longis 2 mm. latis. Ovarium cylindraceum complanatum 3 mm. longum apice angustatum ad stylum abeuns, 2-ovulatum, pubescens, stylo 10 mm. longo supra medium incrassato. Legamina complanata, membranacea, reticulato-venosa, uni-sperma.

HAB. Toroku: Tonpozan, leg. T. KAWAKAMI (No. 1289).

*Lespedeza macrocarpa* HAYATA Mater. Fl. Formos. p. 79, (non BUNGE),

Very near *L. macrocarpa* BUNGE, but quite distinguishable from it by the much longer lobes of the calyx and in having always obovato-oblong emarginate leaves.

### *Mucuna* ADAMS.

#### *Mucuna acuminata* GRAH.?

HAB. Kōtōshō.

Owing to the imperfectness of the specimens, the determination is very doubtful.

*Mucuna hainanensis* HAYATA sp. nov. Rami superiore volubiles, ramulis teretibus glabris multo-sulcatis apice cirrhiferis. Folia 3-foliolata, foliolo terminali obovato-oblongo chartaceo  $6\frac{1}{2}$  cm. longo  $3\frac{1}{2}$  cm. lato apice breve cuspidato ad summum obtuso ad centrum apicis mucronato, mucronibus 1 mm. longis, utraque pagine subglabro vel tenuissime paucissime hirsuto, costis supra impressis subtus tenuiter elevatis, venis lateralibus utroque latere 4-5 tenuissimis, vel subtrinervio margine subintegro basi obtuso, petiolulo 3 mm. longo, stipellis lineari-filiformibus 3 mm. longis, foliolis lateralibus obliquis basi  $\pm$  rotundatis vel subcordatis, rhachidibus 13 mm. longis, petiolis communibus 3 cm. longis subteretibus basi  $\pm$  incrassatis, stipulis lineari-lanceolatis 3 mm. longis. Racemi axillares folio  $\pm$  longiores solitarii 10 cm. longi laxi-florati, bracteis magnis alabastrum floris amplexantibus oblongis 2 cm. longis pubescentibus, pedicellis 1 cm. longis sericeo-pubescentibus. Calyx sericeo-hirsutus pilis circ. 3 mm. longis fulvis dense obtectus, late globoso-campanulatus, alte 5-lobatus, 2-posterioribus conniventibus,

lobo antico longissimo cuspidato-triangulari 13 mm. longo 7 mm. lato apice acuto intus hirsuto, lateralibus antico minoribus 9 mm. longis 4 mm. latis. Vexillum brevius, carinas dimidium æquans, orbiculare  $2\frac{1}{2}$  cm. longum totiusque latum apice rotundatum vel plicato-emarginatum basi breve auriculatum, auriculis truncatis, ungue brevissimo 3 mm. longo 2 mm. lato; alæ oblique oblongo-lanceolatæ 5 cm. longæ 1 cm. latæ basi latere superiore auriculatæ, unguibus 5 mm. longis; carinæ cum alis æquilongæ prope apicem recurvæ apice breve rostratæ aculeato-acutæ lineari-lanceolatæ 6 mm. latæ, latere basi superiore auriculatæ, unguibus 7 mm. longis. Stamina diadelphæ, cum carinis æquilonga, filamentis prope apicem subito superne flexis clavato-incrassatis, antheris hirsutis. Ovarium sessile, dense hirsutum lineare 6 mm. longum, stylo filiformi 4 cm. longo apice  $\pm$  incrassato, partibus incrassatis 1 cm. longis glabris.

HAB. Hainan, leg. Z. KATSUMADA, 1911.

Remarkable for the small size of the leaves.

**Mucuna membranacea** HAYATA sp. nov. Ramuli validiusculi scandentes glabri striati teretes. Folia 3-foliolata, foliolo terminali ovato-rhomboideo, membranaceo 9 cm. longo 6 cm. lato apice obtuso breve cuspidato basi cuneato-acuto utraque pagine hirsuto 3-nervio, nervis et venis lateralibus supra tenuiter subtus prominente elevatis, petiolulis 6 mm. longis hirsutis, stipellis et stipulis lineari-setosis 3 mm. longis, foliolis lateralibus eo terminali æquilongis valde obliquis latere superiore 2– $2\frac{1}{2}$  cm. latis basi acutis, latere inferiore 4– $4\frac{1}{2}$  cm. latis basi latissime truncatis, petiolis communibus foliolo æquilongis, rhachidibus (inter petiolulum terminalem et petiolum) 2 cm. longis subglabris. Racemi axillares solitarii, bracteis non visis. Calyx late campanulatus, (tubo 1 cm. longo 2 cm. lato), villosopubescent longè ferrugineo-pilosus 5-dentatus, dentibus posterioribus connatis brevissimis, antico longissimo cuspidato lanceolato basi 3 mm. lato 12 mm. longo, lateralibus  $\pm$  brevioribus 8 mm. longis basi 4 mm. latis acutis. Vexillum late triangulo-cordatum 3 cm. latum 28 mm. longum apice obtusum subretusum basi auriculatum, auriculis  $\frac{1}{2}$  cm. longis 4 mm. latis truncatis, ungue 4 mm. longo 3–4 mm. lato dorso gibboso-inflato; alæ elongato-

oblongo-lanceolata  $4\frac{1}{2}$  cm. longæ  $1\frac{1}{2}$  mm. latæ obliquæ apice obtusæ, laminis basi latere superiore auriculatis, unguibus  $\frac{1}{2}$  cm. longis margine dense ciliatis; carinæ cum alis æquilongæ a basi usque ad supra medium rectæ, supra medium prope apicem subito superne reflexæ apice acutæ ad summum rostratæ  $\pm$  reflexæ subcartilagineæ lineari-lanceolatæ supra medium latissimæ 7 mm. latæ, laminis basi latere superiore auriculatis, unguibus 1 cm. longis linearibus margine superiore ciliatis. Stamina diadelpha, antheris dimorphis, filamentis versus apicem claviformibus ad summum longe apiculatis, ad apicem apiculorum antheras gerentibus. Ovarium lineare pilosum, stylo filiformi.

HAB. Kōtōshō, leg. S. KUSANO, (Fl.); leg. G. NAKAHARA, Feb. 1906.

**Mucuna subferruginea** HAYATA sp. nov. Scandens, rami subteretes, cortice subcinerascenti rugoso, lenticellis elevatis notati. Folia 3-foliolata, foliolo terminali oblongo-ovato apice obtuso ad summum apiculato (apiculis 3-4 mm. longis vel deciduis) basi obtuso 10 cm. longo  $6\frac{1}{2}$  cm. lato, subtrinnervio vel pinniveno, in exsiccatō supra subglabro nigricanti subtus fulvo-fuscatō tomentoso, ad costam et venas dense fulvo-hirsuto, margine integro, chartaceo vel chartaceo-membranaceo, petiolulo 8 mm. longo, foliolis lateralibus eo terminali æquilongis, latere superiore  $2\frac{1}{2}$  cm. latis, latere inferiore  $4\frac{1}{2}$  cm. latis, basi late truncatis, petiolis communibus 7-8 cm. longis gracilibus dense fulvo-tomentosis, stipulis triangulari-lanceolatis 6 mm. longis 2 mm. latis acutis extus dense pilosis intus glabris. Racemi ad ramos defoliatos lateraliter siti penduli, rhachidibus gracilibus 20 cm. longis dense brevissime fusco-tomentosis, floribus 6-7 cm. longis. Calyx late campanulatus basi superne subgibbosus, tubo  $1\frac{1}{2}$  cm. longo 2 cm. lato, ore 5-dentato, dentibus posterioribus connatis brevissimis, antico cuspidiformi 1 cm. longo basi 7 mm. lato, lateralibus triangularibus brevioribus 5 mm. longis basi 6 mm. latis, extus sericeo-villosis simul longe fulvo-pilosis, intus sericeo-pubescentibus. Vexillum orbiculare 4 cm. latum totiusque longum apice obtuso-rotundatum, basi auriculato-cordatum breve unguiculatum, unguibus 3 mm. longis; alæ semiobovatæ, 6 cm. longæ 23 mm. latæ, apice rotundatæ, basin versus angustatæ basi latere superiore auriculatæ, (auriculis  $\frac{1}{2}$  cm. longis apice obtusis) latere margine inferiore curvatæ latere superiore margine rectæ, extus basin  $\pm$  hirsutæ, unguibus

6-7 mm. longis 3 mm. latis basi recurvis; carinae alam in longitudine  $\pm$  superantes, recurvato-oblancoolatae, 7 cm. longae 13 mm. latae, apice breve rostratae ad summum cartilagineae, supra medium usque ad basin rectae, latere inferiore brevissime minutissime auriculatae, unguibus 6 mm. longis linearibus. Stamina diadelphæ cum carinis æquilongæ. Ovarium lineare complanatum 2 cm. longum  $1\frac{1}{2}$  mm. latum, apice gradatim in stylum abeuns, parce hirsutum, stylo filiformi basi hirsuto apice glabro.

HAB. Akō: Mt. Buisan, ad 5000 ped. alt., leg. S. SASAKI, 1910, Mart. (Fl.).

**Mucuna Tashiroi** HAYATA sp. nov. Scandens. Rami et ramuli subteretes, leviter sulcati, læves, in exsiccato fuscentes, sursum tenues subpilosi, pilis ferrugineis. Folia 3-foliata, in circumscriptione late triangularia 15-20 cm. lata 15 cm. longa (petiolis exceptatis), foliolo terminali æquilato oblongo apice subito acuminato basi cuneato-obtuso membranaceo vel coriaceo 10-12 cm. longo 5-7 cm. lato supra tenuiter ferrugineo-piloso subtus subglabro vel utraque pagine subglabro vel glaberrimo pinninervio vel subtrinnervio, margine subintegro, petiolulo quam petiolis crassiore 7 mm. longo, foliolis lateralibus valde obliquis ovatis circ. 10 cm. longis 6 cm. latis apice subito acuminato-acutis basi late obtusis, latere superiore 2 cm. latis latere inferiore 4 cm. latis, subtrinnerviis rhachidibus (inter petiolos et petiolulos terminales) 2 cm. longis supra leviter sulcatis, petiolis teretibus  $4\frac{1}{2}$  cm. longis basi incrassatis, partibus incrassatis 12 mm. longis 4 mm. in diametro, stipulis cuspidato-lanceolatis 3-4 mm. longis 1 mm. latis apice acuminatis basi obtusis latissimis hirsutis, stipellis cuspidato-linearibus 1-2 mm. longis. Racemi axillares longe pedunculati penduli, sursum florem dense subcapitate subcymose gerentes, pedunculis longissimis 12 cm. longis glabris recurvis pendulis partibus florigeris 3 cm. longis dense floratis, pedicellis ad nodos 3-5 fasciculatis (vel ad ramos brevissimos pedunculorum) longiusculis 2 cm. longis pendulis, bracteis pedunculorum et pedicellorum caduceissimis non visis. Flores longe pedicellati  $3\frac{1}{2}$  cm. longi basi 2-bracteolati, bracteolis magnis alabastra florum amplexantibus deciduis oblique lanceolato-oblongis concavis apice obtusis basi obtusis paralleliter multinervis crassiusculis intus tenuiter brevissimeque

pubescentibus extus pilis longiusculis ferrugineis parce obtectis vel subglabris. Calyx late saccato-campanulatus 12 mm. longus 17 mm. latus basi obliquus, latere superiore subgibbosus, latere inferiore non gibbosus, ore 5-dentatus, dentibus latis brevibus obtusis, dente infimo breve obtuseque cuspidiformi, sinibus inter dentes late rotundatis. Petala albo-viridia, (fide TASHIRO). Vexillum crassiusculum obovatum unguiculatum, cum unguibus  $3\frac{1}{2}$  cm. longum  $2\frac{1}{2}$  cm. latum, lamina late obovata 27 mm. longa 25 mm. lata apice tenuiter emarginato-lobata (lobis rotundatis brevissimis 2 mm. longis, sinibus inter lobos 2 mm. longis acutis) basi truncata utroque latere basi auriculata (auriculis brevissimis paralleliter multinervia prope medium vel infra medium flexuosa, ungue 6 mm. longo  $4\frac{1}{2}$  mm. lato apice campanulato-dilatato, auriculis crassiusculis. Alæ cultriformes cum unguibus  $3\frac{1}{2}$ –4 cm. longæ 11 mm. latæ, laminis semi-oblongis 3 cm. longis 11 mm. latis facie plicato-repandis apice obtusis basi latere superiore auriculatis, (auriculis crassatis triangulari-oblongis 5 mm. longis totiusque latis), intus lamella una instructis extus hirsutis, unguibus 13 mm. longis cuneiformibus apice latioribus 6 mm. latis utroque latere margine hirsutis basi recurvis. Carinæ naviculiformes, sursum latiores deorsum angustiores cum unguibus  $3\frac{1}{2}$  cm. longæ 9 mm. latæ, laminis naviculiformibus 28 mm. longis 9 mm. latis apice cartilagineis acutis facie basi saccato-gibbosis latere superiore auriculatis, unguibus subcuneiformibus 1 cm. longis apice 4 mm. latis margine ciliatis. Stamina diadelpa, filamentis 3 cm. longis, (in partibus liberis) complanatis, altris 5 validioribus, altris 5 tenuibus, antheris filamentorum validiorum oblongis  $1\frac{1}{2}$  mm. longis basi facieque barbatis versatilibus, antheris filamentorum tenuium oblongo-linearibus  $2\frac{1}{2}$  mm. longis glabris versatilibus. Discus dentatus, dentibus 10, approximatis obtusis. Ovarium oblongo-lineare, 6 mm. longum complanatum hirsutum, stylo filiformi apice infra stigmata constricto, stigma semiglobosum.

HAB. Kōshūn: collibus prope Kuraru Aprili, 1909, leg. Y. TASHIRO (Sp. Fl.).

*Dalbergia* LINN.

**Dalbergia Hancei** BENTH.? Fl. Hongk. p. 93.

HAB. Fokien: Usekisan, Nov. 14, 1909, leg. S. NAGASAWA.

*Derris* LOUR.***Derris alborubra*** HEMSLE. in Bot. Mag. t. 8003.

HAB. Hainan, leg. Z. KATSUMADA, 1910.

***Derris hainanensis*** HAYATA sp. nov. Ramuli teretes multi-striati, glabri. Folia impari-pinnata, in ambitu oblonga 8 cm. lata, 13-15-foliolata, foliolis membranaceis obovato-oblongis 4 cm. longis 18 mm. latis apice rotundatis breve cuspidatis, (cuspidibus 1-2 mm. longis ad summum obscure mucronatis), basi obtusis margine integris utraque glabris, costis utraque pagine leviter elevatis, venis lateralibus tenuibus distincte visis, facie sub lente minute denseque tuberculatis vel reticulatis, petiolulis 5 mm. longis, petiolis communibus 7 cm. longis, stipulis oblongo-triangularibus apice obtusis basi  $\pm$  infra insertionem productis truncatis extus tomentosis intus glabris crassiusculis. Flores racemosi vel paniculati, racemis axillaribus vel solitariis 10 cm. longis laxifloratis, pedunculis 5 cm. longis, pedicellis 1-2 cm. longis, bracteis minutis triangularibus globosis apice acutis basi rotundatis extus hirsutis margine ciliolatis intus glabris crassiusculis; basi pedicelli bracteis 1, apice pedicelli bracteis 2 dispositis. Calyx campanulato-cupuliformis, 4 mm. longus 7 mm. latus subglaber prope marginem tenuiter pubescens, ore subtruncatus, obscure brevissime 5-dentatus. Vexillum suborbiculare,  $1\frac{1}{2}$  cm. longum, apice lobato-emarginatum, basi cordatum breve unguiculatum, ungue 3 mm. longo cuneiformi basi 1 mm. lato apice  $2\frac{1}{2}$  mm. lato basi laminæ squamis 2 dispositis, squamis triangulari-cuspidiformibus, 2 mm. longis; alæ  $1\frac{1}{2}$  cm. longæ, laminis oblique oblongis 11 mm. longis 4-5 mm. latis apice obtusis basi latere superiore auriculatis, unguibus 5 mm. longis linearibus; carinæ cultriformes alis æquilongæ  $1\frac{1}{2}$  cm. longæ, laminis oblique oblongis 10 mm. longis infra medium gibboso-inflatis cum alis confluentibus, unguibus linearibus 6 mm. longis. Ovarium sessile lineare 11 mm. longum 1 mm. latum complanatum hirsutum apice gradatim ad stylum 1-2 mm. longum abeuns, stigmate terminali globoso.

HAB. Hainan, leg. K. KATSUMADA, 1911.

Near *D. oblonga*, but differs from it by the quite glabrous calyx and leaves.

**Derris lasiantha** HAYATA sp. nov. Rami subglabri rugosi, cortice rubro-fuscenti lenticellis rubris rotundatis notato. Folia 5-foliolata, foliolo terminali majore oblongo-elliptico 7 cm. longo 27 mm. lato utrinque obtuso vel apice breve cuspidato-obtuso coriaceo, (costis supra impressis subtus elevatis, venis lateralibus supra leviter subtus prominente elevatis, venulis reticulatis), utraque pagine glabro, petiolulo 2 mm. longo transverse rugoso  $\pm$  hirsuto, stipellis setosis 1-1½ mm. longis, foliolis lateralibus terminali conformibus sed minoribus, petiolis cum rhachidibus 7 cm. longis supra sulcatis basi incrassatis, jugis a se 2 cm. remotis. Spicæ paniculatæ terminales, rhachidibus dense sericeo-pubescentibus, pedicellis 4-5 mm. longis cum calyce continuis cum rhachidibus articulatis, bracteis basi pedicelli brevissimis 2 mm. latis ½ mm. longis dense sericeo-pubescentibus, pedicellis sericeo-pubescentibus, glandulis 2 instructis. Calyx campanulatus dense sericeo-pubescentibus 4-dentatus, ore obliquo. Vexillum obovatum 2½ cm. longum 17 mm. latum apice rotundato-emarginatum basi ad unguem contractum, (unguibus 3 mm. longis 2 mm. latis), intus glabrum, extus sericeo-pubescentibus. Stylus valde reflexus.

HAB. Nantō: Sōtō, leg. Y. SHIMADA, Aug. 1907, (No. 1234).

**Derris lasiopetala** HAYATA sp. nov. Rami subrecti teretes subglabri vel tenuiter pubescentes sublæves vel longitudinaliter subrugosi lenticellis minutis parce notati. Folia majuscula circ. 40 cm. longa 9-11-foliolata, foliolo terminali elongato-elliptico 16 cm. longo 6½ cm. lato utrinque obtuso chartaceo vel chartaceo-coriaceo margine subintegro vel suberoso supra glabro subtus fulvo-sericeo-pubescentibus, venis lateralibus 15-16, costis et venis lateralibus gracilibus supra impressis ad marginem attingentibus subtus elevatis, venis  $\pm$  curvatis, venulis inter venas suboblique transversis, petiolulis 7-8 mm. longis subteretibus supra planis pubescentibus, stipellis subulatis 3 mm. longis, foliolis lateralibus eo terminali conformibus ad basin cuneato-obtusis subobliquis, petiolis communibus 10 cm. longis foliolo brevioribus basi  $\pm$  incrassatis pubescentibus teretibus, stipulis oblique lanceolato-triangularibus 6-7 mm. longis apice acuminatis basi 3 mm. latis. Racemi 10-20 cm. longi folio breviores pauci-ramosi vel simplices, rhachidibus ramis pedicellis calycibusque fulvo-sericeo-pubescentibus, bracteis cum stipulo conformibus



sed multo minoribus, pedicellis 6 mm. longis. Calyx (basi 2 bracteolis instructus, bracteolis subrotundatis  $1\frac{1}{2}$  mm. in diametro extus tomentosus intus glabris), late oblique campanulatus 4 mm. longus 5 mm. latus extus pubescens intus glaber, ore late 5-dentatus, dentibus posterioribus connatis apice rotundatis  $\frac{1}{2}$  mm. longis, antico longissimo triangulari-acuto  $1\frac{1}{2}$  mm. longo. Vexillum extus dense sericeo-fulvo-tomentosum intus glabrum multinervium unguiculatum, lamina orbiculari 9 mm. in diametro apice rotundata intus versus apicem  $\pm$  plicata margine integra basi late truncata, ungue lineari 2 mm. longo  $\frac{1}{2}$  mm. lato incrassato intus sulcato; alæ 13 mm. longæ oblique obovato-oblongæ, laminis 9 mm. longis 3–4 mm. latis apice rotundatis basi  $\pm$  angustioribus utroque latere breve auriculatis margine subintegris latere superiore deorsum erosio extus basi hirsutis et apice marginem ciliolatis, unguibus subulatis lineari-cuneatis 3 mm. longis 1 mm. latis versus costam hirsutis; carinæ cum alis æquilongæ, laminis oblique ovato-oblongis extus parce hirsutis 6–7 mm. longis 6 mm. latis apice truncatis oblique rotundatis ciliolatis margine latere superiore suberosio latere inferiore integerrimis basi latere superiore truncatis latere inferiore rectis ad unguem abeuntibus, unguibus linearibus  $4\frac{1}{2}$  mm. longis 1 mm. latis recurvato-rectis. Stamina diadelpa, a basi usque ad infra apicem recta prope apicem subito postice inflexa glabra. Ovarium lineari-ovoideum plus 4 mm. longum basi latissime 1 mm. latum apice attenuatum ad stylum abeuns dense pilosum basi breve stipitatum, stylo basi piloso superne glabro subito reflexo, stigmate terminali punctiformi.

HAB. Hainan, leg. N. KONISHI, 1909, Juli.

### *Pongamia* VENT.

***Pongamia taiwaniana*** HAYATA n. n. = *Galedupa taiwaniana* HAYATA = *Derris taiwaniana* MATSUM. in Sched. Frutex. Caulis erectus 1–2 m. altus, cortice rubro-fulvescenti, maximus 10 cm. in diametro, mediocris 5 cm. in diametro, basi eramosus supra medium ramosus, ramulis superioribus scandentibus sinistrorso-volubilibus, cortice ramulorum in exsiccato rubro-fusco-nigricanti. Folia alterna impari-pinnata, 15–13-foliolata, foliolis oblongo-oblanceolatis 4.5–5 cm. latis quam latis 3-plo longioribus; novella pallido-fulvescentia sericeo-pubescentia, apice acuminata, margine integra, estipellata. Flores racemosi,

racemis axillaribus 2-4-fasciculatis pedicellis 1 cm. longis floribus 2-3-fasciculatis, bracteis obsoletis, petalis ad marginem purpurascentibus. Calyx breve cylindricus, apice subtruncatus, 5-dentatus, dentibus posterioribus subobsoletis, 3-anterioribus conspicuis, medio plus conspicuo. Vexillum obovoideum apice emarginatum; alæ leviter longiores medio cum carinis tenuiter conniventes; carinae apice liberae, basi distinctae. Stamen vexillo oppositum liberum, caetera connata. Stylus filiformis postice recurvus, antice deorsum ciliolatus; stigma terminale, punctiforme; ovarium sessile, ovulis 5. Fructus oblongi subcomplanati  $\pm$  obliqui 4 cm. longi 3 cm. lati 23 mm. crassi 1-spermi exalati lignosi extus dense tuberculati, prope suturam sublæves et obscure costati, in maturo rarius ad suturam inferiorem dehiscentes, apice rotundati ad summum breve apiculati, basi obtusi vel breviter stipitiformes angustati medio sensim et obscure tenuissime vix vel haud constricti, pedicellis 1 cm. longis validis. Semina obreniformia 3 cm. longa  $2\frac{1}{2}$  cm. lata; testa nitida nigricans, ad apicem medio et ad centrum profunde impressa; cotyledonibus amplis late oblongis 3 cm. latis 22 mm. longis basi profunde cordatis, sinibus 14 mm. longis; radícula obsoleta.

HAB. Sankakuyū, leg. K. NAGAI, 1902.

The present plant is one of those leguminous plants which afford a poisonous matter used for fishing by the aborigines in Formosa. It was first labelled by Prof. J. MATSUMURA as *Derris chinensis* BENTH. Soon after, the professor regarded the plant different from BENTHAM'S species and named it *D. taiwaniana*. The same plant was studied by Dr. K. NAGAI who regarded it to be referable to *Lonchocarpus* or more probably to *Coumbulandia*, but not to *Derris*. He then expressed this opinion in a number\* of the Journal of the Tōkyō Chemical Society. In my opinion, the plant certainly does not belong to *Derris* on account of its wingless fruits; nor should it be referred to *Lonchocarpus*, for the plant has a sessile ovary, but has neither elongated pod nor broadened suture. It is also different from *Coumbulandia* in having neither torulose nor rounded pods. A genus to which the present plant should probably be referred is, in my opinion, *Pongamia*, as is seen from the structure of the fruits. The descriptions of

\* Journal of the Tōkyō Chemical Society XXIII.—7, pp. 744-777 (Japanese).

the flowers above given are mainly based upon the account given by Dr. K. NAGAI in his paper above referred to.

*Euchresta* BENN.

***Euchresta Horsfieldii* BENN. var. *formosana* HAYATA n. v. (Tab. XVI.) = *Euchresta Horsfieldii* HAYATA Ic. Pl. Formos. I. p. 207, (non BENN.).** Suffrutex 50–100 cm. alta, non ramosa vel pauciramosa, ramis sursum foliosis zigzag-forme flexuosis, sursum teretibus 3–4 mm. in diametro glabris, apice tenuissime fulvo-pubescentibus. Folia impari-pinnata, cum petiolis 20 cm. longa 14 cm. lata, in ambitu oblonga, foliolis 5–4 omnibus conformibus, foliolis lateralibus oppositis, chartaceo-membranaceis, oblongis vel oblongo lanceolatis, apice acuminatis, basi obtusis, 10 cm. longis 3 cm. latis, supra viridissimis subtus pallidioribus, margine integris, costis tenuissime impressis, subtus elevatis, venis et venulis non distinctis, petiolulis 2 mm. longis, petiolis communibus foliolo brevioribus teretibus supra late sulcatis vel subalatis glabris, jugis foliolorum 3–4 cm. a se remotis. Racemi terminales, circ. 15 cm. longi, pedunculis 3 cm. longis dense floratis, rachidibus et floribus brevissime fulvo-pubescentibus, pedicellis 6–2 mm. longis, bracteis basi pedicelli lanceolatis minutis 2 mm. longis. Calyx longe campanulatus, 8 mm. longus apice 6–7 mm. latus, basi obtusus, basi superiore gibbosus, apice brevis 5-dentatus, (dentibus latis obtusis), extus intusque brevissime pubescens. Petala 5, supra basin calycis sita; vexillum spathulatum 1½ cm. longum basi 2 mm. latum, apice 2-lobatum vel emarginatum, 5½ mm. latum, (lobis rotundatis), deorsum gradatim angustatum, non unguiculatum subplicatum ± recurvum integrum basin extus intusque pubescens; alae recurvæ cultriformes unguiculatæ, laminis semioblongis latere superiore rectis latere inferiore curvis basi latere inferiore auriculatis 9 mm. longis 3 mm. latis, unguibus linearibus 6 mm. longis ¾ mm. latis glabris; carinæ recto-cultriformes 13 mm. longæ, laminis semioblongis 8 mm. longis 4 mm. latis apice obtusis latere inferiore curvis latere superiore subrectis basi auriculatis, unguibus 5½ mm. longis ¾ mm. latis linearibus. Stamina diadelfa, eo vexillo opposito libero, cætris connatis, tubo filamentorum calycis basi connato, filamentis cum carina æquilongis basi extus pubescentibus, antheris versatilibus oblongis. Ovarium complanatum obovato-lineare,

5 mm. longum apice rostratum erecto-recurvum, (stigmatibus punctiformi), basi longe stipitatum, stipite 7 mm. longo glabro recto. Fructus ovoidei 22 mm. longi nitidi nigricantes 1-spermi apice breve apiculati, stipitibus 1 cm. longis validiusculis.

HAB. Kusukusu, Arisan, Sinsuiye, leg. S. SASAKI et B. HAYATA (Aug. Fl., Feb. Fr.), 1912.

Differs from the type in having purplish white flowers with sessile (not unguiculate) standards, much smaller leaflets and larger fruits. The plant was formerly regarded by myself as the same as the type; but a more close examination in the fields has led me to think it better to regard it as a variety of the type.

### *Sophora* LINN.

***Sophora flavescens* AIT. var. *stenophylla* HAYATA n. v.** Caulis subcomplanatus vel teres prominente sulcatus, glaber. Folia alterna imparipinnata in ambitu lanceolata, 20–25 cm. longa 5–6 cm. lata, 25–29-foliolata, foliolis suboppositis vel  $\pm$  alternis jugis a se  $1\frac{1}{2}$ –2 cm. remotis, lineari-lanceolatis 37 mm. longis 6 mm. latis apice acuminatis mucronatis basi obtusis margine integris supra subglabris vel brevissime pubescentibus subtus villosis adpresso-pubescentibus, costis supra impressis subtus elevatis, venis primariis lateralibus non conspicuis, supra in exsiccato fuscentibus subtus pallido-fulvescentibus, petiolulis  $1\frac{1}{2}$  mm. longis pubescentibus, rhachidibus teretibus sulcatis, petiolis communibus 2 cm. longis basi complanatis  $\pm$  dilatatis. Racemi terminales erecti 18 cm. longi, pedunculis 2 cm. longis simplicibus vel rarius ramosis, pedicellis 6 mm. longis pubescentibus. Calyx oblique campanulatus 6–7 mm. longus basi latere superiore gibbosus ore oblique truncatus obscure 5-dentatus, 2-posterioribus latissimis, 3-anterioribus minoribus extus tenuiter pubescentibus. Petala 5 supra basin tubi calycis affixa. Vexillum spathulatum  $1\frac{1}{2}$  cm. longum 5–6 mm. latum apice emarginatum a medio deorsum angustato-unguiforme, unguibus 7 mm. longis  $2\frac{1}{2}$  mm. latis; alae cultriformes (laminis semi-oblongis), 13 mm. longæ, unguibus basin subtubo recurvis; carinæ cum alis æquilongæ, laminis recurvato-oblongis 6 mm. longis basi latere superiore auriculatis, unguibus 6 mm. longis linearibus.

Stamina 10, supra basin distincta basi pubescentia. Ovarium stipitatum hirsutum, stylo ascendenti, stigmate punctiformi.

HAB. Chokansan, leg. U. MORI, Aprili. 1901.

Differs from the type by the much narrower leaves and smaller flowers.

**Sophora tetragonocarpa** HAYATA sp. nov. Rami complanato-subteretes, glabri flavescentes facie late obscureque sulcati. Folia in ambitu oblonga, alterna, 15–20 cm. longa cum foliolis 10 cm. lata, circ. 15-foliolata, foliolis suboppositis vel  $\pm$  alternis, terminali lateralibus conformi lanceolato 6 cm. longo apice obtuso-mucronato (mucronibus brevissimis) basi obtuso chartaceo vel chartaceo-coriaceo margine integerrimo in exsiccato supra fusco nigricanti subtus pallido-fulvescenti supra glabro subtus pubescenti supra tenuissime impresso-reticulato, costa supra impressa subtus prominenti, venis primariis lateralibus utraque pagine non conspicuis, subtus venulis minute reticulatis visis, petiolulis brevissimis 2 mm. longis tenuiter pubescentibus, rhachidibus gracilibus teretibus supra anguste profundeque sulcatis, petiolis communibus foliolum  $\frac{1}{3}$  plo in longitudine æquantibus  $1\frac{1}{2}$  cm. longis supra tenuiter sulcatis basi  $\pm$  incrassatis, jugis foliolorum a se  $1\frac{1}{2}$  cm. remotis. Racemi fructiferi 20 cm. longi. Legumina moniliformia, (monilibus 2–3–4), subcomplanato-tetragono-angulata, ad angulum obtusa subglabra apice longe rostrata, (rostris nunc longissimis nunc brevibus apice acutis) basi stipitata, stipitibus 8 mm. longis, monilibus nunc proximis nunc remotis ad nodos constrictis distinctis vel confluentibus 2-valvatis vel ad suturam inferiorem dehiscentibus, pedicellis 5–7 mm. longis. Semina lævia suboblique complanato-oblonga  $4\frac{1}{2}$  mm. longa, facie minus convexa, dorso plus convexa.

HAB. In regionibus montanis, leg. U. MORI, Juli. 1909.

Near *G. flavescentis* AIT., but differs from it in having larger lanceolate leaves and dehiscing 4-angled moniliformed pods.

### *Bauhinia* LINN.

**Bauhinia erythropoda** HAYATA sp. nov. Ramuli superiores rubro-ferrugineo-tomentosi. Folia cordata, circ. 6 cm. longa,  $6\frac{1}{2}$  cm. lata, apice acute 2-loba, (sinibus inter lobos  $2\frac{1}{2}$  cm. longis acutis, lobis apice obtusis latere

exteriore recurvis latere interiore rectis), basi cordata supra glabra nitida subtus ad nervos ferrugineo-tomentosa 9-nervia, venulis supra elevato-reticulatis subtus planis, petiolis lamina æquilongis 5 cm. longis rubro-ferrugineo-tomentosis apice basique incrassatis, stipulis obovatis obtusis extus ferrugineo-rubro-tomentosis intus glabris. Racemi terminales circ. 10 cm. longi 15 cm. lati, pedicellis longissimis divaricatis 4-5 cm. longis, bracteis linearibus 5 mm. longis acuminatis extus tomentosis intus nigricantibus, rhachidibus et pedicellis tomentosis, pedicellis superiore bracteis minoribus 1-2 instructis. Calycis tubus cylindraceus 1 cm. longus  $\pm$  obliquus 2 mm. latus, limbus 5-fidus, lobis lanceolatis 12 mm. longis  $3\frac{1}{2}$  mm. latis cum tubo extus tomentosis intus glabris 3-nerviis. Stamina matura 3, filamentis ad orem tubi calycis affixis  $1\frac{1}{2}$  cm. longis basi validiusculis apice tenuissimis basi dense hirsutis sursum glabris, antheris oblongo-linearibus  $5\frac{1}{2}$  mm. longis 2 mm. latis versatilibus. Ovarium stipitatum, stipite cum latere calycis tubi adnato. Petala 5 obovata 23 mm. longa 12 mm. lata apice  $\pm$  emarginata basi subito unguiculata (unguibus 5 mm. longis) margine crispata extus parce hirsuta intus glabra, unguibus utroque latere hirsutis. Ovarium complanatum obliquum dense fulvo-rubro-hirsutum, stylo flexuoso glabro, stigmatibus dilatato  $\pm$  peltato.

HAB. Hainan, leg. Z. KATSUMADA, 1910.

Near *B. ferruginea* ROXB., but differs from it by the oblong unguiculate petals.

**Bauhinia longiracemosa** HAYATA sp. nov. Ramuli graciles flexuosi, tenuiter pubescentes fusco-nigricantes. Folia alterna cordata chartacea vel chartaceo-coriacea triangulari-cordata 8-9 cm. longa 7-7 $\frac{1}{2}$  cm. lata apice late obtusa et tenuiter retusa, ad centrum mucronata, basi late et leviter cordata, margine subintegra, 7-nervia, supra tenuiter subtus distincte elevata, supra nitida subtus pallidiora, ad medium secundum costam subplicata, petiolis 2 $\frac{1}{2}$ -3 cm. longis apice basique incrassatis fusco-nigricantibus gracilibus, stipulis deciduis minutis oblongis obtusis. Racemi subterminales 20 cm. longi 3 cm. lati, pedunculis 6 cm. longis, pedicellis 1 cm. longis basi 1 bracteis instructis, bracteis cuspidatis 1 $\frac{1}{2}$  mm. longis rhachidibus et pedicellis sericeo-pubescentibus. Calyx-tubus campanulatus 2 mm. longus

2½ mm. latus intus discis impletus, lobis 5 triangulari-lanceolatis 3½ mm. longis basi 1½ mm. latis intus glabris extus pubescentibus. Petala 5 ad orem calycis tubi affixa 5½ mm. longa unguiculata, unguibus 1½ mm. longis, laminis oblongis facie margineque crispatis extus dorso tenuiter pubescentibus. Stamina 5, 3 fertilia 2 abortiva, filamentis staminum fertilium validiusculis 1 cm. longis glabris, antheris oblongo-linearibus 2½ mm. longis. Ovarium stipitatum, stipitibus ad laterem tubi calycis adnatis, partibus liberis supra calycis tubum 1 mm. productis. Ovarium complanatum 2-3 cm. longum recurvum ad suturas inferiorem et superiorem hirsutum, stylo ± recurvo 1½ mm. longo validiusculo, stigmatibus terminali.

HAB. Shintiku, Taihei, leg. Y. SHIMADA, Oct. 1907. (No. 5759).

Near *B. Championi* BENTH., but differs from it by the longer terminal racemes having larger flowers with longer petals.

### *Intsia* THOU.

***Intsia Tashiroi* HAYATA = *Ajzelia Tashiroi* HAYATA.** Frutex, ramis teretibus fulvo-cinerascentibus glabris minute lenticellatis, flexuosis. Folia paripinnata, 2-juga, foliolis oblique oblongis, 7 cm. longis 38 mm. latis, chartaceo-membranaceis apice obtusis, basi rotundato-acutis, latere superiore 23 mm. latis, latere inferiore 1½ cm. latis, (costis curvatis supra minus subtus plus elevatis), utraque pagine glabris, venis et venulis utraque pagine distincte elevatis grosse reticulatis, margine integris vel ± undulatis in exsicco fulvo-viridescentibus subtus ± pallidis, vel subconcoloris, margine nervo-marginatis, petiolulis 5 mm. longis, rhachidibus 23 mm. longis glabris complanatis tenuissime sulcatis, petiolis communibus 1½ cm. longis ± complanatis supra tenuissime sulcatis basi dilatatis. Flores cymosi, cymis terminalibus 5 cm. longis totiusque latis, pedunculis 2 cm. longis multi-ramosis, pedicellis infra calycem articulatis, bracteis et bracteolis non visis. Calycis tubus discifer elongatus tubiformis 5 mm. longus ½ mm. latus, segmentis 4 parum inæqualibus oblongis 5 mm. longis omnibus pubescentibus valde imbricatis. Petalum 1, unguiculatum glabrum orbiculari-reniforme, 6 mm. latum 4 mm. longum margine undulato-plicatum, ungue 2 mm. longo hirsuto. Stamina 3 declinata, filamentis elongatis 1½ cm. longis hirsutis, antheris oblongo-lineari-

bus  $2\frac{1}{2}$  mm. longis, loculis longitudinaliter dehiscentibus. Staminoidia 4, filiformia 1 mm. longa. Ovarium lineare 2 mm. longum ad suturam hirsutum stipitatum, (stipite calycis tubo hinc adnato),  $\infty$ -ovulatum, stylo elongato.

HAB. Yāmaya archipelago, leg. Y. TASHIRO.

Near *Afzelia bijuga* (*Macrobium bijugum* COLEBR. in Tran. Lin. Soc. XII. t. 17), but differs from it in having much more obtuse leaves.

### *Acacia* WILLD.

***Acacia hainanensis*** HAYATA sp. nov. Rami teretes longitudinaliter striati, ferrugineo-rubro-pubescentes, spinosi, spinis rectis 2 mm. longis acutis basi dilatatis, horizontaliter rectis vel  $\pm$  recurvis. Folia alterna bi-paripinnata, in ambitu obovata, 10–20 cm. longa, 8 cm. lata, circ. 12–juga, jugum terminale brevius, id proximum juxta terminalem longissimum, iis inferioribus gradatim brevioribus, id inferius brevissimum, jugis longissimis in ambitu linearibus 6 cm. longis 12 mm. latis pari-pinnatis apice aristis 1 mm. longis terminatis basi truncatis, petiolulis  $1\frac{1}{2}$  mm. longis, pinnulis 50–60–jugis linearibus  $\pm$  falcatis vel divaricato-rectis 6 mm. longis 1 mm. latis apice obtusis basi truncatis, costis eccentricis latere superiore angustissimis latere inferiore latioribus basi truncatis sessilibus, rhachidibus pinnarum angulatis hirsutis, rhachidibus foliorum gracilibus profunde sulcatis hirsutis ad insertiones jugorum supra glandulis cupuliformibus instructis, petiolis communibus 2–8 cm. longis subglabris supra profunde sulcatis teretibus, (supra basin glandula una stipitata instructis, glandulis a axilla circ. 1 cm. remotis), basi incrassatis, stipulis minutis oblongis  $1\frac{1}{2}$  mm. longis caduceissimis. Capitula florum cymosa, cymis terminalibus 5–10 cm. longis pyramidalibus divaricato-multi-ramosis, pedicellis 1– $1\frac{1}{2}$  cm. longis solitariis vel geminatis vel ternatis basi bracteis instructis, bracteis divaricatis oblongis 2 mm. longis. Capitulum globosum 8 mm. in diametro, floribus  $\infty$ , receptaculum hirsutum globosum  $1\frac{1}{2}$  mm. in diametro, bracteis florum lineari-spathulatis 1 mm. longis apice hirsutis. Calyx campanulatus 5-lobatus 2 mm. longus glaber 5-lobatus, lobis oblongo-triangularibus circ. 1 mm. longis obtusis. Petala 5, sublibera, lanceolata,  $1\frac{1}{2}$  mm. longa. Stamina  $\infty$ , 2– $2\frac{1}{2}$  mm. longa, filamentis crispatis glabris, antheris minutis. Ovarium ignotum.



HAB. Hainan, leg. Z. KATSUMADA, 1910.

Near *A. concinna* DC; but differs from it in having much smaller lanceolate stipules and much smaller leaves.

*Albizzia* DURAZZ.

**Albizzia Juribrissin** DURAZZ. FORBES. et HEMSL. Ind. Fl. Sin. I. p. 216.

HAB. Nantō: Torokō, leg. U. MORI, 1909, Juli.

Exactly agrees with the Japanese, Chinese and Korean, specimens preserved in the Tōkyō Herbarium.

DISTRIB. Persia to Japan and in eastern tropical Africa (HEMSLEY).

Rosaceæ.

*Prunus* LINN.

**Prunus persica** S. et Z. var. **Davidiana** CARR.

HAB. Cult?

*Pygeum* GERTN.

**Pygeum Preslii** MERR.

HAB. Exact locality is not given (Herb. Taihoku Museum).

*Rubus* LINN.

**Rubus arisanensis** HAYATA sp. nov. Rami viridiusculi subrecti striati glabri aculeolati, aculeis descendento-recurvis longitudinaliter complanatis cuspidato-triangularibus 4 mm. longis basi 4 mm. latis. Folia alterna, in ambitu cordato-ovata, 11 cm. longa 10 cm. lata, apice acuminata, basi leviter cordata, 3-lobata, (lobo terminali longissimo oblongo 8 cm. longo 3½ cm. lato apice acuminato basi ± contracto duplicato-serrulato, lobis lateralibus terminali brevioribus), 3-nervia, (nervis 55° a se divaricatis rectis, nervo centrali 10 cm. longo, nervis lateralibus 6 cm. longis), utraque pagine glabra subtus pallidiora supra ad nervos subplano; hirsuta, subtus nervis elevatis

deorsum aculeolatis, sinibus inter lobos acutis, petiolis 3 cm. longis glabris aculeolatis, stipulis persistentibus, iis foliorum veteriorum minutis petiolis adnatis partibus liberibus  $\frac{1}{2}$  mm. longis a axilla 4 mm. remotis, iis foliorum majoribus cuspidato-linearibus cum petiolis adnatis, partibus liberis 4 mm. longis minus 1 mm. latis. Gemmæ floriferae laterales basi perulatæ, perulis imbricatis ovatis cuspidatis vel late ovatis 4–8 mm. longis glabris vel apice hirsutis. Flores ad axillas foliorum ramulorum lateralium solitarii, vel ad apicem ramulorum lateralium terminales, breve pedicellati. Calyx subplanus, extus hirsutus, lobis patentibus cuspidato-triangularibus 12 mm. longis basi 5 mm. latis, apice longe cuspidatis, intus velutinosus. Petala 5, rhomboideo-ovata, 1 cm. longa 6 mm. lata, apice triangulari-acuta, basi cuneata basi  $\frac{1}{2}$  mm. lata, margine subintegra. Stamina  $\infty$ , filamentis  $4\frac{1}{2}$  mm. longis complanatis  $\frac{1}{3}$  mm. latis apice contractis glabris, antheris oblongis 1 mm. longis  $\frac{3}{4}$  mm. latis, connectivis glabris. Receptaculum carpellorum cylindraceum circ. 2 mm. longum elevatum vel subconico-cylindraceum glabrum, carpella 4 mm. longa. Ovarium recurvum oblique obovoideum subcomplanatum facie glabrum, dorso dense hirsutum, stylo basi hirsuto sursum glabro.

HAB. Montibus Arisan: Azumayama leg. B. HAYATA et S. SASAKI, Jan. 1912.

Near *R. Fauriei* and *R. palmatus*.

**Rubus calycinoides** HAYATA sp. nov. Suffrutex; caulis enermis scandens vel procumbens, radicans, cortice glabro tenuiter soluto, ramis lateralibus profusis sed semper brevioribus 3–4 cm. longis axillaribus. Folia coriacea, orbiculato-cordata, 2–2 $\frac{1}{2}$  cm. in diametro, supra glabra fuscentia subtus fulvo-floccoso-tomentosa, (supra venis et venulis impressis reticulatis subtus elevatis reticulatis), 5-lobata, (lobis latis apice rotundatis), margine denticulata, petiolis cum lamina æquilongis, stipulis palmiformibus vel obovatis apice laceratis 7 mm. longis 4 mm. latis intus glabris extus hirsutis tenuibus persistentibus. Flores ad apicem ramorum lateralium terminales, solitarii vel axillares, pedunculis brevibus dense hirsutis bracteis 3–4 instructis, bracteis stipulo conformibus. Calyx extus dense pilosus (pilis altris eglandulosis altris glandulosis), 5-lobatus, lobis ovatis 8 mm. longis 5 mm. latis apice sub-

laceratis vel integris extus dense hirsutis intus tenuiter villosis. Petala 5 latissime obovata rotundata, 5 mm. longa, 6 mm. lata, apice rotundata, basi late truncata, brevissime unguiculata, (unguibus  $\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis), palmato-multinervia, (nervis intus planis extus elevatis), intus glabra, extus parce ad medium hirsuta. Stamina  $\infty$ , circ. 3 mm. longa, filamentis glabris  $2\frac{1}{2}$  mm. longis complanatis  $\frac{1}{2}$ – $\frac{1}{3}$  mm. latis apice contractis, antheris suborbicularibus margine longe barbatis  $\frac{1}{2}$  mm. longis. Receptaculum carpellorum convexum pilosum. Carpella  $\infty$  sessilia 4 mm. longa. Ovarium semiorbiculatum  $\frac{2}{3}$  mm. longum complanatum subrecurvum apice ad stylum abeuns, stylo filiformi 3 mm. longo apice  $\pm$  dilatato brevissime 2-labiato. Cupula fructifera subplana. Achænia matura drupacea oblique oblonga 4 mm. longa  $\pm$  complanata, stylis persistentibus. Pyrenæ oblique ovatæ 2 mm. longæ apice obtusæ basi subrotundatæ facie profunde rugulosæ.

HAB. In Monte Morrison, ad 12000 ped. alt., leg. U. MORI et S. KATO.

Near *R. calycinus* WALL.; but differs from it in having much smaller leaves and lacerate stipules.

**Rubus cochinchinensis** TRATT.; FOCKE Species Ruborum in Bib. Bot. XVII. Heft. 72. p. 49.

Hab. Hainan, leg. Z. KATSUMADA, 1910.

DISTRIB. An endemic plant.

**Rubus floribundo-paniculatus** HAYATA sp. nov. Rami recti, pubescentes, aculeis descendento-recurvis  $1\frac{1}{2}$  mm. longis. Folia alterna ovata 9 cm. longa  $4\frac{1}{2}$  cm. lata apice acuta ad apicem breve cuspidata basi obtusa margine serrata deorsum prope basin integra, (costis supra impressis hirsutis, venis lateralibus utroque latere 5–6 supra hirsutis tenuibus recurvis, venulis supra non conspicuis, costis venis subtus elevatis conspicuis hirsutis, venulis subtus conspicuis distinctis transversis reticulatis), subtus pallidiora, petiolis brevissimis  $\frac{1}{2}$  cm. longis hirsutis, stipulis linearibus 7–8 mm. longis longe laciniatis, laciniis filiformibus. Flores paniculati, paniculis terminalibus floribundis 16 cm. longis 14 cm. latis pyramidalibus, rhachidibus pedicellis calycibusque omnibus velutinosi, rhachidibus et ramis rhachidis minute aculeolatis, bracteis stipulis conformibus sed minoribus. Calyx patens subplanus extus veluti-

nosus, lobis ovatis 7 mm. longis apice acutis acuminatis ad apicem cuspidiformibus 4 mm. latis intus basi glabris. Petala 5 obovato-spathulata 3 mm. longa  $1\frac{1}{3}$  mm. lata apice retusa vel obtusa, sursum irregulariter denticulata vel subintegra deorsum integra. Stamina  $\infty$ , filamentis glabris 6 mm. longis, antheris suborbicularibus utrinque emarginatis, connectivis glabris. Receptaculum carpellorum dense pilosum, pilis rectis. Carpella  $\infty$ , 7 mm. longa. Ovarium deorsum dense pilosum sursum glabrum, stylo filiformi glabro.

HAB. Shintikuchō: Taiheishō, leg. Y. SHIMADA, Sept. 1907.

**Rubus kotōensis** HAYATA sp. nov. Rami glabri sublaeves rubescentes inermes. Folia pinnata generaliter 5-foliolata rarius 7-foliolata ovata in ambitu, cum petiolo 15 cm. longa 9 cm. lata, pinna terminali magna ovata 6 cm. longa 3 cm. lata apice acuminata basi truncato-cordata vel rotundata chartacea margine duplicato-serrulata utraque pagine glabra (supra costis venis impressis pilis minutis parce vestitis, subtus prominentibus nudis rubro-coloratis) subtus glauca, (venis lateralibus utroque latere costæ 12 subrectis apicem serrarum attingentibus), petiolulo  $1\frac{1}{2}$ –2 cm. longo, pinnis lateralibus oppositis cum eo terminali conformibus sed minoribus, petiululis brevissimis 3 mm. longis supra sulcatis puberulis, petiolis circ. 3 cm. longis cum rhachidibus glabris supra profunde sulcatis basi  $\pm$  dilatatis, jugis pinnarum a se circ. 2 cm. remotis, stipulis linearibus cum petiolo adnatis apice liberis, partibus liberibus linearibus 1 cm. longis 1 mm. latis ab axilla foliorum 2 mm. remotis. Cynæ terminales vel ad apicem ramorum lateralium terminales paucifloratæ glabræ 3–4 cm. longæ 3–5-floratæ, bracteis linearibus glabris. Calycis lobi ovati 9–10 mm. longi 5–6 mm. lati apice cuspidati basi  $\pm$  contracti, extus glabri versus marginem velutinosi, intus basi glabri sursum velutinosi. Petala 5 orbiculato-ovata 11 mm. longa 8 mm. lata apice rotundata, basi late cuneato-contracta, ad insertionem 1 mm. lata. Stamina  $\infty$ , filamentis complanatis 4 mm. longis  $\frac{1}{3}$  mm. latis apice contractis filiformibus, antheris oblongis utrinque emarginatis glabris. Receptaculum carpellorum toriforme cylindraceum 3 mm. longum glabrum, carpellis glabris. Syncarpium ellipsoideum 11 mm. longum 9 mm. latum. Achænia semiovoidea subcomplanata  $1\frac{1}{2}$  mm. longa glabra reticulato-rugosa.

HAB. Kōtōshō, leg. K. MIYAKE, 1889; S. SASAKI 1913.

Near *R. fraxinifolius* POIR., but differs from it by the unarmed branches and petioles, and much smaller flowers.

**Rubus laciniato-stipulatus** HAYATA sp. nov. *Rubus moluccanus* HAYATA Ic. Pl. Formos. I. p. 228, (non LINN.). Rami dense piloso-villosi aculeolati, aculeis 2-3 mm. longis  $\pm$  descendento-patentibus  $\pm$  recurvatis basi longitudinaliter dilatatis. Folia in ambitu cordato-orbicularia 10-5 cm. longa totiusque lata 5-lobata (lobis brevioribus) margine duplicato-denticulata vel grosse dentata (dentibus denticulatis) apice obtusa basi late cordata, supra fuscentia rugosissima, (venulis impressis reticulatis, areolis reticulorum elevatis ad centrum areolarum pilo recto uno instructis) supra pilosa, (pilis adpressis), subtus tomentoso-villosa albicantia, (venis venulisque subtus elevatis reticulatis, areolis reticulorum subtus impressis), 5-nervata, nervis rectis supra inermis subtus basi  $\pm$  aculeolatis, petiolis dimidium laminæ folii æquantibus villosis aculeolatis, stipulis 9-10 mm. longis profunde laciniatis, laciniis 7-6 mm. longis lineari-filiformibus, extus tomentosus intus glabris. Racemi brevissimi petiolo breviores vel æquilongi axillares pauciflorati, floribus 2-3 rarius solitariis, pedicellis circ. 1 cm. longis bracteis 2-3 instructis, stipulis conformibus sed minus laciniatis valde angustioribus. Calyx patens subplanus extus basi dense pilosus 5-lobatus, lobis ovatis 7 mm. longis apice cuspidato-acuminatis 5 mm. latis integris vel pauci-serratis extus medio dense pilosis versus marginem villosis, intus breve villosis. Petala 5 ovata  $8\frac{1}{2}$  mm. longa  $6\frac{1}{2}$  mm. lata apice obtusa ad centrum  $\pm$  retusa basi late cuneato-contracta ad unguiculum circ. 1 mm. longum abeuntia margine obscure crenulata utrinque glabra. Stamina  $\infty$ , 2-3 seriatim disposita  $4\frac{1}{2}$  mm. longa, filamentis glabris 4 mm. longis  $\frac{1}{2}$  mm. latis sub-complanatis, antheris orbicularibus connectivis longe barbatis. Receptaculum carpellorum convexum glabrum vel paucissime pilosum. Carpella 1 cm. longa, stylis filiformibus. Achænia semi-cordata 2 mm. longa, exocarpiis tenuibus exsiccatis, pyrenis dorso profunde transverse rugosis facie irregulariter rugosis.

HAB. Sōkeiton, leg. G. NAKAHARA.

Near *R. alceaefolius* POIR. and *R. gilvus* FOCKE; but differs from them in having very slenderly laciniate stipules.

**Rubus leucanthus** HANCE in WALP. Ann. II. p. 468; FÖCKE Sp. Rub. in Bib. Bot. XVII. Heft.-72, p. 148.

HAB. Hainan, leg. Z. KATSUMADA, 1910.

DISTRIB. South China.

**Rubus dolichocephalus** HAYATA sp. nov. Rami glanduloso-pilosi, pilis patentibus 2 mm. longis globuliferis, aculeis descendento-recurvis latere compressis 3 mm. longis basi triangulari-dilatis. Folia in ambitu triangularia 9 cm. longa 11 cm. lata 3-foliolata (vel superiore simplicia), (foliolo terminali oblongo apice acuminato basi leviter cordato 7 mm. longo 3½ mm. lato duplicato-serrulato, petiolulo terminali 2½ cm. longo, foliolis lateralibus oblongis terminali brevioribus basi obtusis ± obliquis, petiolulis 0 vel 2 mm. longis), chartacea viridia supra adpresse hirsuta subtus velutinosi, (costis et venis lateralibus supra planis tenuiter hirsutis, subtus tenuiter elevatis rubro-coloratis, costis aculeolatis, venis lateralibus parallelis subrectis utroque latere costæ 10-12), petiolis 5 cm. longis foliolo laterali æquilongis glanduloso-hirsutis aculeolatis, stipulis minutis linearibus elobatis basi cum petiolo adnatis apice liberis, partibus liberis 6 mm. longis linearibus hirsutis. Cymæ terminales paucifloræ longe pedicellatæ glanduloso-pilosæ aculeolatæ. Calyx extus glanduloso-pilosus, lobis circ. 1 cm. longis oblongis apice longe cuspidatis, (cuspidibus setiformibus validis 3 mm. longis), basi 4½ mm. latis medio glanduloso-pilosis, prope marginem dense velutinosi, intus basi glabris sursum velutinosi. Petala 5, oblique orbicularia 8 mm. in diametro extus dense hirsuta intus glabra apice rotundata ad centrum mucronata basi contracta 1 mm. lata. Stamina ∞, filamentis filiformibus glabris, antheris oblongis 1½ mm. longis, connectivis glabris. Receptaculum carpellorum toriforme cylindricum 5 mm. longum pilosum; carpella ∞ circ. 2 mm. longa; ovarium semi-obovoideum ⅔ mm. longum facie latereque glabrum dorso sursum pilis glandulosis obtectum, stylo filiformi 1½ mm. longo apice subtruncato. Syncarpium ovoideum 13 mm. longum 10 mm. latum, calyce valde desuper reflexo. Achænia semi-ovoidea ± recurva 1½ mm. longa subcomplanata facie glabra dorso minute setulosa stipitata, stipitibus complanatis 1 mm. longis ½ mm. latis.

HAB. Arisan : Karapin, leg. B. HAYATA et S. SASAKI, Jan. 10, 1912.

Near. *R. rosæfolius*, but differs from it in having ellipsoid syncarps and glandular hairy branch.

**Rubus rosæfolius** SMITH subsp. **Maximowiczii** FOCKE Sp. Rub. in Bib. Bot. XVII. Heft.-72, p. 155.

HAB. Funkiko, leg. B. HAYATA et S. SASAKI, Jan. 19, 1912.

DISTRIB. Southern parts of Japan.

**Rubus rugosissimus** HAYATA sp. nov. Caulis gracilis scandens teres tenuiter tomentosus minute et remote aculeolatus, (aculeis minutis 1-2 mm. longis), sursum dense molle tomentosus. Folia alterna chartacea vel tenuiter coriacea longe petiolata ovato-triangularia vel ovato-cordata in ambitu, 6½ cm. longa 5½ cm. lata 5-lobata margine duplicato-dentata, (lobo terminali 3 cm. longo 3 cm. lato apice acuto vel obtuso, lobis lateralibus brevioribus), basi leviter cordata vel late truncata supra fuscentia subglabra vel parce hirsuta rugosissima, (venulis supra impressis, areolis reticulorum elevatis), tuberculato-rugosa, subtus dense molle fulvo-flavo-tomentosa (nervis venis venulisque elevatis areolis reticulorum subtus impressis), 5-nervata, nervis rectis divaricatis apicem leborum attingentibus, petiolis 3½ cm. longis lamina leviter brevioribus basi non incrassatis dense villosis, stipulis late obovatis 7 mm. longis basi 3 mm. latis apice rotundatis laceratis extus villosis intus glabris. Flores ad axillas clustati vel breve racemosi, racemis axillaribus vel ad apicem ramorum lateralium terminalibus folio brevioribus, rachidibus flexuosis dense villosis, bracteis basi pedicellorum sitis stipulis conformibus, pedicellis 4 mm. longis villosis bracteolis 2 instructis, bracteolis alternis 3 mm. longis ovatis obtusis apice paucè lacerato-dentatis extus villosis. Calycis tubus cupuliformis extus villosus, limbus 5-lobatus, lobis ovato-cuspidatis 7 mm. longis basi 5 mm. latis apice cuspidatis paucè dentatis vel integris extus villosis intus brevissime villosopubescentibus. Petala late rhomboideo-orbiculata 5 mm. longa 5½ mm. lata apice rotundata ad centrum retusa basi late cuneata, basi contracta basi ½ mm. lata, nervis non conspicuis. Stamina ∞, 2-3 serialiter disposita, filamentis glabris 3½ mm. longis subcomplanatis, antheris suborbicularibus, connectivis longe barbatis. Receptaculum carpellorum pilosum

conicum  $1\frac{1}{2}$  mm. longum. Carpella 6 mm. longa; ovarium  $\frac{3}{4}$  mm. longum semi-ovoideum glabrum apice ad stylum abeuns, stylo filiformi apice 2-labiato. Achænia matura oblique ovoidea 2 mm. longa  $1\frac{2}{3}$  mm. lata, exocarpiis tenuibus. Pyrenæ  $\pm$  achænio minores profunde subechinato-rugulosæ.

HAB. Hakitsu, leg. S. SASAKI et B. HAYATA Juli, 1913.

Near *R. Elmeri* FOCKE.

**Rubus Shimadai** HAYATA sp. nov. Rami teretes fuscentes minute aculeolati, (aculeolis 1 mm. longis), flexuosi tenuiter et breviter pubescentes vel glabri. Folia alterna cordata vel reniforme cordata  $4\frac{1}{2}$  cm. longa 6 cm. lata apice rotundata basi cordata obscure tenuiter 5-lobata margine denticulata, supra glabra vel ad venas impressas  $\pm$  pubescentia, subtus ad venas elevatas tomentellata, 5-nervata, venulis transverse reticulatis impressis, subtus nervis venis venulisque prominente elevatis reticulatis, petiolis lamina vix brevioribus hirsutis, stipulis minutis 3 mm. longis laciniatis. Racemi breviores circ. 1 cm. longi axillares, pedicellis 3 mm. longis bractea una instructis, bracteis stipulis conformibus, omnibus tomentosis. Calyx subplanus, lobis 5 ovatis  $5\frac{1}{2}$  mm. longis basi 4 mm. latis apice acutis integris vel apice 2-3-dentatis extus piloso-villosis intus villosis; cupula plana intus glabra sed ad centrum pilosa. Stamina  $\infty$  2-seriatim disposita 3 mm. longa, filamentis filiformibus, antheris orbicularibus, connectivis glabris. Petala 5, rhomboideo-ovata apice rotundata basi late cuneata ad unguem brevissimum contracta integra apice sursum  $\pm$  denticulata glabra. Achænium maturum semi-cordatum  $2\frac{1}{2}$  mm. longum.

HAB. Kelungchō: Taiheishō, leg. Y. SHIMADA, 1908, Dec.

**Rubus sphærocephalus** HAYATA sp. nov. Rami dense glanduloso-hirsuti, (pilis transverse patentibus) aculeolati, aculeolis transverse patentibus sursum descendento-recurvatis latere compressis triangulari-cuspidatis maximis 5 mm. longis basi 4 mm. latis. Folia pinnata, in ambitu oblongo-triangularia, pinnis 7-5-3, pinna terminali maxima, jugo pinnarum juxta terminalem pinnam minimo, jugis inferioribus majoribus, pinnis lateralibus oppositis, pinna terminali ovata 5 cm. longa  $2\frac{1}{2}$ -3 cm. lata herbacea utraque pagine parce hirsuta



apice acuminata basi obtusa margine duplicato-serrulata prope basin subintegra, costis et venis planis subtus tenuiter elevatis, venis lateralibus subrectis utroque latere costæ 9-10, petiolulo 2 mm. longo, pinnis lateralibus ea terminali conformibus sed  $\pm$  minoribus subsessilibus, petiolis communibus 4 cm. longis cum rhachidibus parce glanduloso-hirsutis aculeolatis, aculeolis descendento-recurvatis, jugis a se 3 cm. remotis, stipulis linearibus cum petiolis adnatis apice liberis, partibus liberis 5 mm. longis a basi axillarum 3 mm. remotis. Flores laxè cymosi, cymis terminalibus pauci-floratis, floribus 2-3, pedicellis longis. Calycis lobi extus glanduloso-hirsuti, (pilis globuliferis rubris) triangulari-ovati apice longe cuspidati (cuspidibus exceptis) 8 mm. longi 6 mm. lati apice cuspidibus longissimis 6 mm. longis instructi intus basi glabri sursum velutinosi. Petala late orbicularia 13 mm. longa 16 mm. lata apice rotundata basi contracta, ad insertionem 1 mm. lata, margine integra, extus hirsuta, intus glabra. Stamina  $\infty$ , filamentis glabris, antheris ellipticis  $1\frac{1}{2}$  mm. longis, connectivis glabris. Receptaculum carpellorum subglobosum  $4\frac{1}{2}$  mm. longum, glabrum stipitatum, stipitibus latis 1 mm. longis basi 2 mm. latis hirsutis. Carpellum  $2\frac{1}{2}$  mm. longum; ovarium semi-ovoideum complanatum facie glabrum dorso glanduloso-setulosum stipitatum, stipitibus brevibus pilosis, stylo filiformi 2 mm. longo apice breve 2-labiato. Syncarpium depresso-globosum 14 mm. latum 11 mm. longum. Achænium semi-obovoideum  $1\frac{1}{2}$  mm. longum, stipitatum, (stipite circ. 1 mm. longo  $\frac{1}{3}$  mm. lato pilosiusculo), subcompressum latere facie glabrum reticulato-rugosum, dorso apice minute glanduloso-setulosum.

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan. 1912.

Near *R. dolichocephalus* HAYATA; but differs from it by the depressingly globose syncarps.

### *Potentilla* LINN.

**Potentilla Morii** HAYATA sp. nov. Herba perennis. Rhizomata suberecta 6-7 mm. longa basi ramosa, (ramis ad radices validiusculas abeuntibus), apice folia radicalia et caules floriferos 2-3 emittentia. Folia radicalia cum petiolis 3-4 cm. longa vel longiora, 3-foliolata dense molle pilosa, foliolo terminali obovato  $1\frac{1}{2}$  cm. longo 11 mm. lato utraque pagine molle piloso herbaceo utroque

latere margine dentibus 6 instructo, (dentibus ascendentibus triangularibus  $1\frac{1}{2}$  mm. longis), apice in ambitu rotundato basi cuneato-obtuso prope basin integro, (supra costis venisque impressis, venis lateralibus utroque latere costæ 6 subrectis ad apicem dentum attingentibus subtus tenuiter elevatis), petiolulo brevissimo 1 mm. longo, foliolis lateralibus  $\pm$  minoribus basi valde obliquis, petiolis 2 cm. longis vel longioribus longe molleque villosis, stipulis lanceolatis 7 mm. longis 2 mm. latis apice acuminatis extus pilosis intus glabris basi petiolo adnatis sursum liberis. Folia caulina iis radicalibus conformia sed minora, superiora sessilia. Caulis subrectus 5–10 cm. longus interdum 20–30 cm. longus tunc procumbens toloniformis. Flores ad apicem caulis solitarii vel axillares, pedicellis rectis 1–2–3 cm. longis pilosis. Calyx extus dense pilosus, lobis 2-seriatim dispositis, exterioribus spathulatis 4 mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis basi  $\pm$  contractis, lobis interioribus majoribus elongato-triangularibus  $4\frac{1}{2}$  mm. longis apice acuminatis extus hirsutis basi latissimis  $2\frac{1}{2}$  mm. latis intus basi glabris sursum pubescentibus. Petala 5 flava orbiculato-obcordata 8 mm. longa totiusque lata apice emarginata basi late cuneato-contracta ad insertionem  $\frac{1}{3}$  mm. lata 5-nervata. Stamina circ. 20,  $3\frac{1}{2}$  mm. longa, filamentis glabris  $2\frac{1}{2}$  mm. longis, antheris 1 mm. longis oblongo-linearibus. Receptaculum carpellorum dense albo-pilosum ellipsoideum. Carpellum oblique obovatum, stylo laterali 1 mm. longo columnari apice punctiformi. Syncarpium depresso-globosum. Achænium oblique ovoideum a latere compressum 1 mm. longum facie læve dorso apice  $\pm$  rugulosum.

HAB. Tonkurankei, Bataiankei, leg. U. MORI, Aprili. 1910.

Near *P. Matsumuræ* WALB., but differs from it by the much shorter styles and more numerous carpels.

**Potentilla morrisonensis** HAYATA sp. nov. Rhizomata ascendento-repentia, stipulis foliorum deciduorum persistentibus imbricatis complete obtecta, (stipulis imbricatis tenuibus castaneis cum petiolo connatis, apice liberis 1 cm. longis 4 mm. latis), apice folia radicalia 3–5 et caulem singulum emittentia. Folia radicalia digitatim 3-foliolata, foliolo terminali obovato-cuneato-obtriangulari 14 mm. longo 11 mm. lato apice in ambitu rotundato-truncato

basi cuneato medio sursum margine inciso-dentato, (dentibus utroque latere 7 vel 5 oblongis 3-4 mm. longis  $2\frac{1}{2}$  mm. latis apice obtusis basi non contractis), herbaceo supra minus hirsuto subtus plus hirsuto margine ciliato subsessili vel brevissime petiolulato, foliis lateralibus eo terminali æquilongis valde obliquis plus incis, petiolis 4-5 cm. longis longe hirsutis gracilibus, stipulis magnis lanceolatis circ. 1 cm. longis  $2\frac{1}{2}$  mm. latis extus hirsutis intus glabris tenuibus castaneis petiolo fere connatis apice liberis, partibus liberis subtriangularibus 3 mm. longis, stipulis complete caulem amplexantibus. Caulis hirsutus 10-12 cm. longus erectus gracilis simplex vel paucè ramosus, foliis caulinis minoribus breve petiolatis vel subsessilibus. Calyx extus hirsutus intus glaber, lobis exterioribus lanceolatis  $4\frac{1}{2}$  mm. longis minus 2 mm. latis apice acutis basi contractis ad insertionem  $\frac{1}{2}$  mm. latis, lobis interioribus latioribus oblongis 5 mm. longis 2 mm. latis basi  $\pm$  dilatatis apice obtuso-acutis. Petala 5 obcordata 9 mm. longa totiusque lata flava apice obcordato-emarginata basi late cuneata ad insertionem  $\frac{1}{2}$  mm. lata. Stamina 20, filamentis glabris filiformibus 4 mm. longis, antheris cordatis minus 1 mm. longis apice emarginatis. Receptaculum toriforme pilosum. Achænium ovoideum latere subcompressum  $1\frac{1}{2}$  mm. longum, stylo infra apicem ovarii latere sito filiformi 3 mm. longo.

= *P. gelida* HAYATA Ic. Pl. Formos. I. p. 237.

HAB. Mt. Morrison., ad 13094 ped. alt., 1905, Nov.

Near *P. Matsuurae* WALB., but differs from it by the much longer style and fewer achenes.

### *Rosa* LINN.

***Rosa transmorrisonensis*** HAYATA sp. nov. Rami glabri minute longitudinaliter rugulosi teretes remote aculeolati, aculeolis 4 mm. longis rectis transverse patentibus, cicatricibus aculeolorum oblongis, ramulis lateralibus numerosis 2-3 cm. longis non ramosis flore singulo terminatis. Rami floriferi laterales basi foliis 5-6 suffulti, foliis infimis minimis, superioribus majoribus, foliis infimis 8 mm. longis 7-foliolatis, foliolis parvis 3 mm. longis, stipulis cum petiolo connatis 3-4 mm. longis lanceolatis serrulatis, foliis superioribus majoribus  $2\frac{1}{2}$  cm. longis in ambitu obovatis 7-foliolatis, foliolo

terminali obovato vel ovato-oblongo 11 mm. longo  $7\frac{1}{2}$  mm. lato utrinque obtuso margine serrato, (serris ascendentibus subrectis acutis latere superioribus  $\frac{1}{2}$  mm. longis latere inferioribus  $1\frac{1}{2}$  mm. longis apice acutis  $\pm$  callosis), supra costa impressa, venis venulisque impressis reticulatis, subtus costa prominente elevata aculeolis truncatis minutis 2-3 instructa, petiolulo 3-4 mm. longo, foliolis lateralibus eo terminali conformibus subsessilibus minoribus, foliolis infimis minimis 6 mm. longis  $3\frac{1}{2}$  mm. latis, foliolis oppositis, jugis 4 mm. a se remotis, petiolis communibus 1 cm. longis cum rhachidibus supra profunde sulcatis subalatis setulis glandulosis truncatis remote instructis, ad nodos jugorum  $\pm$  hirsutis, subtus aculeolis acutis remote instructis, stipulis linearibus fere perfecte cum petiolo connatis 5 mm. longis margine fimbriatis, partibus liberis linearibus 2 mm. longis recurvis. Flores ad apicem ramorum lateralium solitarii terminales, pedunculis  $1\frac{1}{2}$  cm. longis setulis glandulosis paucissime instructis cæterum glabris. Calycis tubus urceolato-ovoideus  $3\frac{1}{2}$  mm. longus  $2\frac{1}{2}$  mm. latus, lobis cuspidato-ovatis extus prope marginem setulis glandulosis instructis pauce hirsutis intus dense velutinosus 9 mm. longis (excepte cuspidibus) 3 mm. latis apice cuspidatis vel tricuspidatis, (cuspidibus linearibus 3 mm. longis  $\frac{2}{3}$  mm. latis), basi utroque latere cuspidibus singulis instructis, interdum utraque pagine velutinosus. Petala 5 obcordata apice cordato-emarginata vel breve 2-lobata basi late cuneata ad basin truncata, partibus truncatis 3 mm. latis ad basin contractis ad insertionem 1 mm. latis. Stamina  $\infty$  fauce tubi calycis affixa  $\infty$ -seriata, filamentis circ. 4 mm. longis suberispatis filiformibus glabris, antheris late reniformibus 1 mm. latis, latioribus quam longioribus basi 2-lobatis apice emarginatis. Discus ultra calycis tubum productus annulari-conicus, partibus productis  $\frac{1}{2}$  mm. longis. Styli 9-10. Carpella 9-10, in tubo calycis incluso longe et dense albo-setuloso-pilosa, cavo calycis dense piloso-setuloso, setulis albis erectis rectis 2 mm. longis. Ovarium fusiforme 1 mm. longum, stylo filiformi longe exserto 5 mm. longo apice incrassato, stigmate botrioideo-pectinato.

HAB. Mt. Morrison, leg. U. MORI.

Near *R. Willmottiae* HEMSLEY (Bot. Mag. t. 8186), but differs from it by the much smaller leaflets with acuter serration and much smaller alternate (not opposite) spines.

**Rosa microcarpa** LINDL.; FORBES et HEMSL. Ind. Fl. Sin. I. p. 251.

HAB. Tōyenchō: leg. S. SASAKI, Sept. 1908.

DISTRIB. China.

*Sanguisorba* LINN.

**Sanguisorba formosana** HAYATA sp. nov. = *Poterium formosana* HAYATA (Tab. XVII.). Herba 80–100 cm. alta glabra. Folia radicalia pinnata in ambitu oblongo-oboata cum petiolis 13 cm. longa 5 cm. lata, pinnis 15–17, superioribus majoribus infimis minoribus, pinna terminali longissima lineari 3–3½ cm. longa 5–6 mm. lata glabra apice obtuso-acuta vel obtusa basi acuta margine regulariter serrulata, (serrulis subtriangularibus apice ascendento-recurvis) chartacea, costa supra impressa subtus elevata, venis lateralibus supra subimpressis subtus elevatis, pinnis lateralibus terminali conformibus sed minoribus a se 1–2 cm. remotis basi truncatis obliquis, infimis minimis breve petiolulatis, petiolulis 1–2 mm. longis cum rhachidibus profunde sulcatis gracilibus, petiolis communibus 2–3 cm. longis basi dilatatis. Folia caulina iis radicaliis conformia remote sita superioribus minoribus interdum 3-foliolatis. Caulis gracilis elongatus glaber sulcatus remote ramosus, ramis elongatis gracilibus suberectis subrectis. Flores dense capitulato-spicati, spicis elongato-pedunculatis, pedunculis in longitudine variabilibus 3–14 cm. longis gracilibus, bracteis minutis 2–3 instructis. Spicæ (vel capitula) cylindraceæ erectæ rectæ vel ± recurvæ 1–2–3 cm. longæ 6–7 mm. latæ, rhachidibus (vel toris capitulorum) hirsutis, bracteolis 3 basi floris singuli dispositis minutis linearibus filiformibus vel spathulatis 2 mm. longis hirsuto-ciliolatis, floribus sessilibus. Calycis tubus obconicus 1½ mm. longus 1 mm. latus 4-alatus lobis 4, 2–exterioribus minoribus 2½ mm. longis 1½ mm. latis oblongis, 2–interioribus latioribus obovatis intus glabris extus hirsutis basi et apice subincrassatis ad marginem tenuibus hyalinis. Petala 0. Stamina 4, filamentis 2½ mm. longis glabris, antheris didymis ½ mm. longis. Styli minuti 1 mm. longi, stigmatibus dilatatis peltatis.

HAB. Tōyenchō: Daikyūyen, leg. S. SASAKI, Nov. 1910.

Near *S. officinale* L., but differs from it in having narrower leaves and very much smaller linear bracts.

*Cotoneaster* MENDK.

**Cotoneaster Konishii** HAYATA sp. nov. Rami subrecti, cortice fusco-cinerascenti, glabri læves non vel paucè lenticellati, ramulis lateralibus numerosis brevioribus 5 cm. longis cicatricibus foliorum transverse semi-annuliformibus dense notatis, apice folios et flores gerentibus. Folia chartacea rhomboideo-ovata obovata vel ovata 23 mm. longa 15 mm. lata apice acuta basi cuneato-obtusa vel obtusa utraque pagine hirsuta, costis supra impressis, venis lateralibus 4-5 impressis subtus costis et venis elevatis, petiolis 2-3 mm. longis supra sulcatis, stipulis linearibus vel lanceolatis 2-3 mm. longis. Flores cymosi, cymis terminalibus pauci-floratis hirsutis, bracteis lanceolatis vel linearibus hirsutis. Calyx campanulatus extus hirsutus intus glaber 4 mm. longus 5 mm. latus apice 5-lobatus, lobis triangularibus  $1\frac{1}{2}$  mm. longis totiusque latis margine barbatis intus glabris. Petala 5, cuneato-obovata 4 mm. longa  $2\frac{1}{2}$  mm. lata apice rotundata basi cuneata ad insertionem  $\frac{1}{3}$  mm. lata margine sursum erosa prope basin integra. Stamina 10, filamentis glabris  $2\frac{1}{2}$  mm. longis deorsum dilatatis basi  $\frac{2}{3}$  mm. latis apice angustissimis, antheris oblongis  $\frac{4}{5}$  mm. longis. Carpella 5-3, ventrali libera, dorso cum calyce adnata, apice libera, dense molleque barbis obtecta, stylis rectis 2 mm. longis apice truncatis.

HAB. Bataiankei, ad 9710 ped. alt., leg. N. KONISHI, 1902.

Near *C. integerrima* and *acutifolia*, but differs from them by the much smaller leaves.

*Photinia* LINDL.

**Photinia buisanensis** HAYATA sp. nov. Rami validi cinerascetes verrucosi rugosi lenticellis notati, cicatricibus foliorum late obtriangularibus. Folia oblongo-lanceolata oblanceolata, lamina coriacea 11 cm. longa 3 cm. lata apice acuta acuminata basi cuneato-attenuata margine supra basin sursum remote serrata, (serris 8 mm. a se remotis ascendente-recurvis), marginem  $\pm$  recurva prope basin integra utraque glabra, (costis supra leviter elevatis, subtus prominente elevatis, venis lateralibus primariis supra valde subtus tenuiter elevatis, venis secundariis supra elevatis conspicuis subtus

tenuissimis vel non conspicuis, venis lateralibus utroque latere costæ 12-13 subrectis vel  $\pm$  recurvis prope sinus serrarum furcato-ramosis, subtus pallidiora, petiolis 3 cm. longis tenuiter alatis basi  $\pm$  incrassatis. Flores racemosi vel racemoso-paniculati 4-5 cm. longi 4 cm. lati dense florati, rhachidibus et pedicellis dense ferrugineo-pilosis, bracteis oblique ovatis 4 mm. longis intus glabris extus dense pilosis. Calyx campanulatus, tubo campanulato 4 mm. longo fauce 4 mm. lato intus glabro extus dense piloso, limbo 5-lobato, lobis oblongo-triangularibus 3 mm. longis basi 2 mm. latis apice obtusis intus glabris. Petala 5 obovata 8 mm. longa 5 mm. lata apice breve 2-lobata (lobis 1 mm. longis apice obtusis), basi cuneata subunguiculata alba extus glabra intus parce longe et tenuiter barbata. Stamina circ. 30, ad faucem tubi calycis affixa 3-4 mm. longa erecta, filamentis glabris  $3\frac{1}{2}$  mm. longis basi  $\pm$  dilatis apice filiformibus, antheris oblongo-ovatis 1-1 $\frac{1}{2}$  mm. longis. Ovarium basi calycis tubi adnatum 1 $\frac{1}{2}$  mm. longum 3-loculare, loculis 2-ovulatis, stylis basi ad medium dense barbatis sursum glabris medio sursum 3-fidis, ramis erectis.

HAB. Buisan, leg. S. SASAKI, Mart. 1910.

Near *R. deflexa* HEMSLEY, but differs from it by the much smaller leaves and flowers.

### *Osteomeles* LINDL.

***Osteomeles anthyllidifolia*** LINDL.; FORBES et HEMSLEY. Ind. Fl. Sin. I. p. 265.

HAB. Kōtōshō, leg. S. SASAKI, Juni. 1913.

DISTRIE. Japan, Bonin, Sandwich, Maingala and Pitcairn Islands (HEMSLEY.)

## Saxifrageæ.

### *Mitella* LINN.

***Mitella japonica*** MIQ. var. ***formosana*** HAYATA n. v. Rhizoma ascendento-repens, radices numerosas emittens, squamis obtectum. Folia omnia radicalia 5-10 ad apicem rhizomatis, longe petiolata, lamina ovato-cordata 6 cm. longa 4 cm. lata apice triangulari-acuta basi profunde cordata

herbacea margine inciso-serrata obscure 5-7 lobata, (lobis triangulari-acutis, serris acutis), facie superiore setuloso-hirsuta (pilis 1-2 mm. longis) ad nervos venasque glabra, facie inferiore (venis et venulis exceptis) glabra ad nervos venas venulasque hirsuta 5-7-nervia, nervis rectis ad apicem lorum attingentibus, nervis supra planis subtus elevatis, venulis reticulatis, petiolis 4-5 cm. longis lamina æquilongis  $1\frac{1}{2}$  mm. latis dense barbatis, barbis transverse patentibus  $1\frac{1}{2}$  mm. longis, stipulis intra-axillaribus singularibus subrotundatis glabris margine ciliolatis scariosis subrubrescentibus 8 mm. in diametro. Scapi aphylli 20-30 cm. longi a medio sursum florigeri patento-hirsuti basi bracteis 2 suffulti, bracteis stipulo conformibus. Flores subsecundatim spicati, rachidibus dense breveque glanduloso-hirsutis, (pilis transverse patentibus), floribus a se 5 mm. remotis, bracteis singulis basi pedicellorum dispositis, bracteis quadrangularibus 1 mm. latis apice divaricatim 3-cuspidatis, pedicellis 1-2 mm. longis gradatim ad calycem abeuntibus. Calyx late campanulatus 2 mm. longus 3 mm. latus, limbo 5-lobato, lobis acuto-triangularibus 1 mm. longis totiusque latis extus dense breveque glanduloso-pubescentibus. Petala 5, divaricato-laciniata 3 mm. longa, laciniis 5 lateralibus oppositis, a terminali angulo  $90^\circ$  divaricatis, terminali 2 mm. longa, lateralibus 1 mm. longis, omnibus filiformibus, laminis (partibus principalibus) linearibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis glabris. Stamina 5, petalis opposita calycis limbo affixa 1 mm. longa, filamentis subcomplanatis linearibus circ. 1 mm. longis glabris, antheris cordato-reniformibus apice triangulari-acutis basi reniforme cordatis  $\frac{1}{4}$  mm. latis latioribus quam longioribus. Ovarium inferius apice subplanum  $\pm$  elevatum ad stylum abeuns, stylis 2 columnaribus  $\frac{2}{3}$  mm. longis apice 2-furcatis, ramis  $\frac{1}{3}$  mm. longis apice stigmatosis. Capsulæ 2-valvata, valvis membranaceis. Semina ellipsoideo-fusiformia circ. 1 mm. longa  $\frac{5}{11}$  mm. lata latere 1-costata facie longitudinaliter reticulata, testa fusco-rubra; albumen copiosum.

HAB. Arisan, leg. S. SASAKI et B. HAYATA, Jan. 1912. Mt. Morrison, 8000-12000 ped. alt.

*Mitella japonica* HAYATA in Fl. Mont. Formos. p. 88, (non MIQUEL).

Very near the type, but distinguishable from it in having rectangularly divaricated lacines of the petals, longer stamens and smaller seeds which are not covered by the minute trabecules.



*Chrysosplenium* LINN.

**Chrysosplenium formosanum** HAYATA sp. nov. (Tab. XVIII.) Herba stolonifera; caulis 10–15 cm. longus. Folia radicalia longe petiolata, lamina cuneato-ovata  $1\frac{1}{2}$  cm. longa 13 mm. lata, herbacea, apice rotundata, basi obtriangulati-cuneata, margine a medio sursum undulato-crenulata, utraque pagine tenuiter hirsuta, (pilis crispatis 1 mm. longis pagine inferiore brevioribus), margine crispato-ciliolata, (venis non conspicuis), basi subito ad petiolum abeuntia, petiolis 2 cm. longis laminam 2-plo superantibus sursum  $1\frac{1}{2}$  mm. latis basi dilatatis 3 mm. latis tenuibus margine longe ciliolatis, ciliis 1– $1\frac{1}{2}$  mm. longis crispatis, utraque facie hirsutis, pilis crispatis. Caulis a basi ramosus  $\pm$  hirsutus (pilis brevioribus) foliis caulinis minoribus 4–5 instructus, foliis alternis 2 cm. a se remotis. Folia caulina minora orbicularia  $\frac{1}{2}$  cm. in diametro, margine crenulata hirsuta, petiolis lamina longioribus. Flores quasicymosi, cymis pauci-laxifloratis basi foliis floralibus singulis suffultis, foliis floralibus iis caulinis conformibus sed minoribus sessilibus vel breve petiolatis. Sepala 4 late rotundata inæqualia, alia majora  $1\frac{1}{2}$  mm. longa 2 mm. lata basi latissima apice rotundata, alia minora  $1\frac{1}{3}$  mm. longa  $1\frac{1}{2}$  mm. lata, omnia viridia extus glabra intus pilis brevissimis obtecta. Stamina 8, filamentis brevissimis  $\frac{1}{4}$  mm. longis complanatis, antheris terminalibus circ.  $\frac{1}{2}$  mm. latis  $\frac{1}{4}$  mm. longis reniformibus rima terminali dehiscentibus. Ovarium semi-inferius complanatum brevissimum 1-loculare, stylis 2 minutis teretibus  $\frac{1}{3}$  mm. longis  $\frac{1}{2}$  mm. a se remotis erecto-rectis.

HAB. Montibus centralibus, leg. T. KAWAKAMI et U. MORI, Aprili. 1910.

Near *C. japonicum* MIQ., but differs from it by the hairy leaves and 4-merous flowers.

*Deutzia* THUNB.

**Deutzia kelungensis** HAYATA (Fig. 16.) Ic. Pl. Formos. II. p. 8.

OBSERV. Rami graciles cinerascetes teretes ut videntur scandentes, ramulis gracilibus angularibus tenuiter stellato-pubescentibus, inter petioles transverse striatis. Folia opposita ovato-oblonga vel ovato-lanceolata 8 cm. longa 3 cm. lata apice acuminata, (acuminibus acutis vel obtusis), basi obtusa

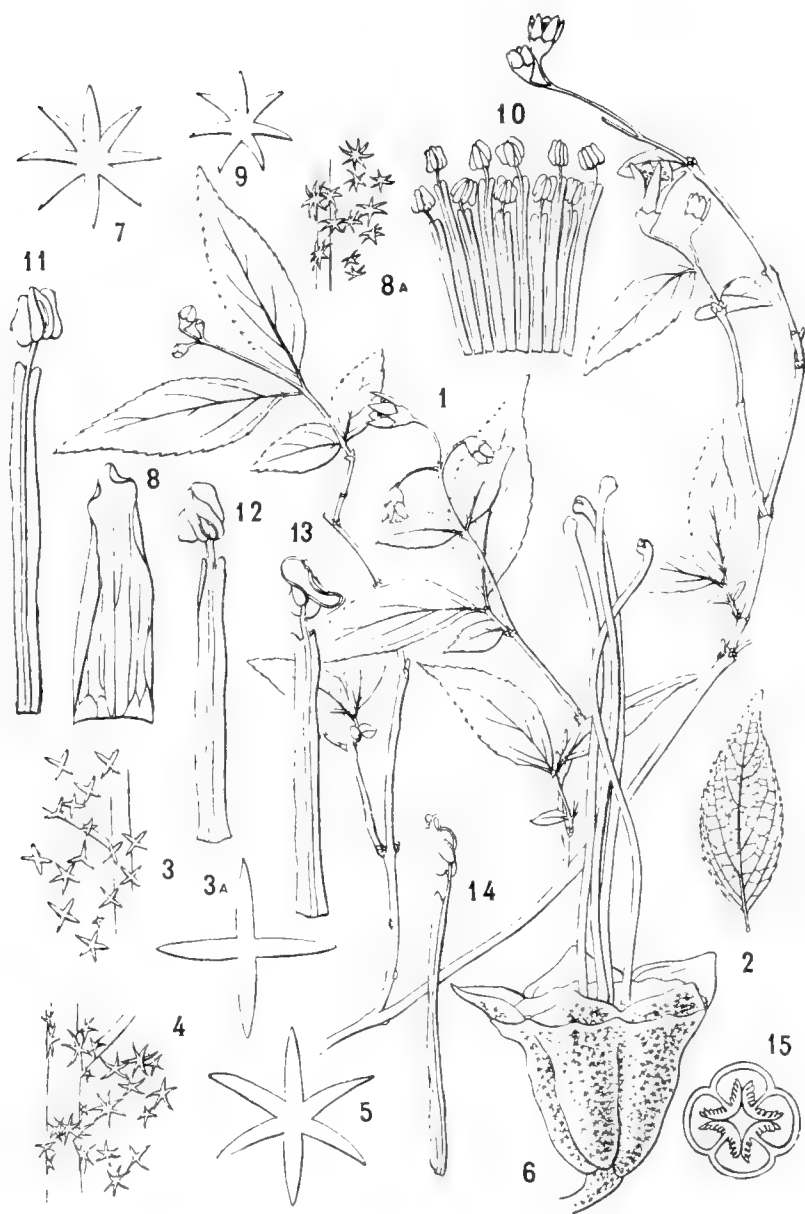


Fig. 16.

*Deutzia kelongensis* HAYATA. 1, a branch; 2, a leaf; 3, a portion of a leaf showing hairs on the upper side; 3A, one of the hairs, much more magnified; 4, the same portion, of a leaf, showing hairs on the under side; 5, one of the hairs; 6, a flower, petals and stamens taken off; 7, a hair on the calyx; Fig. 8, a petal; 8A, hairs on the same; 9, one of the hairs, much more magnified; 10, stamens; 11, 12, 13, 14, a stamen, seen from different sides; 15, cross section of an ovary. Fig. 1 and 2,  $\times \frac{1}{3}$ ; others variously magnified.

rotundata vel acuta margine serrulata, (serrulis brevissimis breve apiculatis), supra scabra stellato-pubescentia, costis et venis tenuissimis subtus pallidissima pilis stellatis densiuscule vel parce obiecta costis et venis lateralibus prominentibus, petiolis 6 mm. longis supra sulcatis. Paniculæ ad apicem ramulorum terminales vel axillares 6 cm. longæ pauci-floratæ, pedicellis 2 mm. longis, bracteis minutis subulatis. Calyx campanulatus extus plus minus stellato-pubescentia 3 mm. longus, lobis patentibus triangularibus obtusis vel neutis  $1\frac{1}{2}$  mm. longis 2 mm. latis caducissimis. Petala 5-6 duplicato-valvata erecta vel erecto-patentia oblonga  $8\frac{1}{2}$  mm. longa 4 mm. lata apice subacuta basi late truncata margine plicata plus minus pubescentia vel subglabrata. Stamina 10-12, alia longiora, alia breviora, staminibus longioribus 7 mm. longis, filamentis dilatatis 6 mm. longis 1 mm. latis apice obtuse ob-sagittato-attenuatis. Discus annularis integer. Styli 4 distincti apice leviter 2-lobati stigmatosi. Capsulæ subglobo-æ  $3\frac{1}{2}$  mm. longæ, 4-lobatæ, septicide in cocos 4 dehiscentes. Semina numerosa, fusiformia, late leviter compressa, utrinque alis  $\frac{1}{2}$  mm. longis instructa, longitudinaliter striatis.

HAB. Kelung: Zuibō, leg. T. KAWAKAMI, Mart. 1907, (No. 4235).

Near *D. gracilis* and *D. parviflora*, but differs from the former in having much broader hairy calyx-lobes and more scabrous leaves, and from the latter in having nearly erect duplicately valvate petals and a few-flowered panicles or even racemes. The petals of *D. parviflora* appear to be deeply imbricate, but those of the present plant are apparently valvate.

*Pileostegia* HOOK. f. et THOMS.

***Pileostegia urceolata*** HAYATA sp. nov. Ramuli, cortice longitudinaliter rugoso. Folia opposita, obovato-elliptica vel oblanceolata,  $5\frac{1}{2}$ -6 cm. longa 2 cm. lata, apice obtusa brevissime cuspidato-obtusa, basi cuneato-obtusa, margine integra, coriacea, utraque pagine glabra, (costis supra impressis subtus elevatis, venis primariis lateralibus supra non visis subtus tenuiter elevatis gracilibus utroque latere costæ 7-8 a costa angulo  $70^\circ$  egressis rectis prope marginem furcatis), subtus pallidissima, petiolis 1 cm. longis supra sulcatis basi  $\pm$  dilatatis glabris. Paniculæ terminales cum pedunculis 10 cm. longæ 9 cm. latæ, ramis oppositis, ramulis divaricatis, bracteis et bracteolis lanceolatis in

magnitudine variabilibus, pedicellis ultimis 2-3 mm. longis. Calycis tubus obconico-urceolatus vel obconicus 2 mm. longus 3 mm. latus, ultra ovarium inferius productus, partibus productis  $\frac{1}{2}$  mm. longis, ore 5-dentatus, dentibus latis-simis brevissimis  $\frac{1}{3}$  mm. longis  $1\frac{1}{2}$  mm. latis glabris. Petala 5, valvata, in calyptram connata; calyptra jam anthesin soluta  $2\frac{1}{2}$  mm. in diametro  $1\frac{1}{2}$  mm. longa; petalis singulis triangularibus 2 mm. longis  $1\frac{2}{3}$  mm. latis extus glabris intus apice puberulis. Stamina 10 exserta 2-2 $\frac{1}{2}$  mm. longa, filamentis crispatis 2 mm. longis glabris, antheris cordatis  $\frac{1}{5}$  mm. longis apice emarginatis paucissime hirsutis. Ovarium perfecte inferius obconicum apice planum, stylo breve columnari  $1\frac{1}{2}$  mm. longo. Discus annularis 10-dentatus, dentibus obtusis.

HAB. Arisan, leg. K. UYEMATSU, 1913, (No. 37).

Near *Pileostegia viburnoides* and its variety *parviflora*; but differs from them by the smaller leaves, smaller flowers with much shorter calyx-lobes, shorter stamens and somewhat urceolate calyx-tubes.

***Pileostegia viburnoides*** HOOK. f. et THOMS.; MATSUM. et HAYATA, Enum. Pl. Formos. p. 132.

HAB. Taichū: Suiryūtō, (No. 1213); Sekikakusan; Chōsōkei, (No. 158); Kussaku, leg. B. HAYATA et S. SASAKI, Juli. 1913.

### *Hydrangea* LINN.

***Hydrangea anomala*** DON.=(*H. glabra* HAYATA) in SCHNEIDER Illust. Handb. Laubh. II. p. 943, (fide SCHNEIDER).

As I have never seen a specimen of *H. anomala* DON., I am not in a position to decide whether the two (*H. anomala* and *H. glabra*) are exactly identical or not. I am here merely following SCHNEIDER'S opinion.

***Hydrangea glabrifolia*** HAYATA sp. nov. Rami recti teretes, cortice cinerascenti, ramulis rectis divaricatis rubro-purpurascensibus. Folia coriacea lanceolata, 5-5 $\frac{1}{2}$  em. longa  $1\frac{1}{2}$ -2 em. lata, apice acuta, acuminata, basi cuneato-obtusa margine minute serrulata, (serrulis mucroniformibus  $\frac{1}{2}$  mm. longis 3-4 mm. a se remotis), apice basique subintegra, (costis supra tenuiter impressis

subtus elevatis, venis supra planis subtus tenuiter elevatis), utraque pagine glabra, petiolis 6 mm. longis basi leviter dilatatis supra sulcatis. Cymæ terminales pseudo-umbellatæ, radiis 3-4 exterioribus longioribus  $1\frac{1}{2}$  cm. longis, interioribus brevioribus 1 cm. longis pseudo-umbellulatis, umbellulis 10-12-floratis. Flores steriles marginales paucissimi interdum ad nullum reducti, pedicellis longioribus 1 cm. longis; sepala 4, obovato-orbicularia, 9 mm. longa 8 mm. lata, margine integra, 3-nervia, venis lateralibus 4-5 paucissimis non reticulatis. Flores fertiles parvi, pedicellis brevioribus 2-3 mm. longis; calycis tubus 1 mm. longus obconico-campanulatus  $1\frac{1}{3}$  mm. latus, limbo 5-dentato, dentibus remotis oblongo-triangularibus  $\frac{1}{2}$  mm. longis  $\frac{1}{4}$  mm. latis; petala 5, oblonga, 2 mm. longa, 1 mm. lata, apice obtuse breve cuspidata basi obtuse brevique cuneata, ad insertionem  $\frac{1}{4}$  mm. lata; stamina circ. 10,  $1\frac{1}{2}$  mm. longa, filamentis glabris crassiusculis teretibus 1 mm. longis, antheris oblongis utrinque emarginatis  $\frac{2}{3}$  mm. longis. Carpella 3, styli 3 circ. 1 mm. longi crassiusculi.

HAB. Tandaisan, leg. U. MORI, Aprili. 1910.

Near *H. chinensis*, but differs from it by the quite glabrous leaves, narrower lobes of the calyx, and many other points.

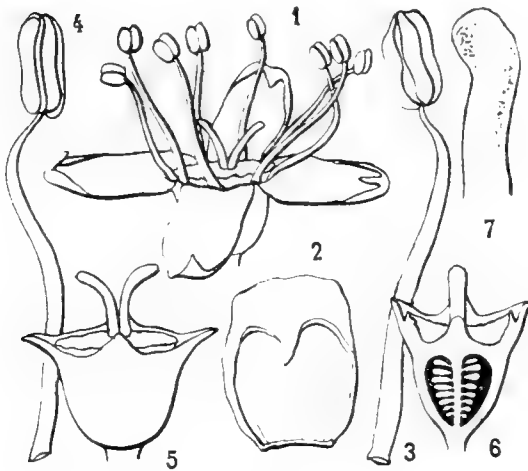


Fig. 17.

*Hydrangea integra* HAYATA. 1, a flower; 2, a petal; 3, 4, stamens; 5, an ovary; 6, the same in vertical section; 7, apical portion of a style. All figures are magnified.

***Hydrangea integra***  
HAYATA (Fig. 17) Fl. Mont. Formos. p. 90, t. 7; Ic. Pl. Formos. II. p. 5. Descriptio auctata: Folia plantæ novellæ dentata, sed adulta integra. Alabastrum florum globosum 3 cm. in diametro perulis circ. 10 involueratum, perulis membranaceis semi-hyalinis rotundatis breve

denseque flavo-tomentosis (pilis stellatis adpressis) intus tenuiter extus dense pilosis oppositis, extimis minimis semiglobosis latis apice rotundatis 2 cm. latis 1 cm. longis basi subcordatis interioribus magnis rotundatis valde concavis alabastrum florum semi-amplexantibus  $2\frac{1}{2}$  cm. longis explicato  $3\frac{1}{2}$  cm. latis apice rotundatis vel leviter emarginatis, intimis 2 minoribus plus minus angustioribus. Inflorescentia expansa umbellatim cymosa 8-10 cm. lata 4-5 cm. longa, ramis tomentosis vel glabris. Fl. steriles: sepala 2 rotundata integra. Fl. fertiles: calyx tetragono-obconicus, 4-costatus, limbo 4-5 dentato, dentibus obtusis vel rotundatis; petala 4-5; stamina ignota.

HAB. Nantôchô: Rinkihô, leg. T. TANAKA, Juni. 1912.

**Hydrangea Kawakamii** HAYATA (Fig. 18.) Ic. Pl. Formos. II. p. 6; Fl. Mont. Formos. p. 90, t. 8. Descriptio auctata: Pedicelli florum 2-3 mm. longi.

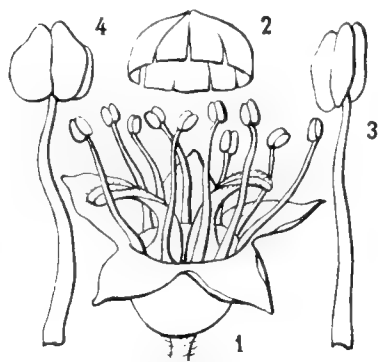


Fig. 18.

*Hydrangea Kawakamii* HAYATA. 1, a flower, petals taken off; 2, petals nearly uniting into a cap; 3, 4, stamens.

Calyceis tubus suburceolato-globosus, 1 mm. longus,  $1\frac{1}{2}$  mm. latus, parce pubescens, limbo 5-lobato, lobis dentiformibus triangularibus minus 1 mm. longis obtusis basi dilatatis latis. Petala 5, valvata, apice confluentia in calyptram connata, (calyptra jam anthesin decidua), oblonga 2 mm. longa apice acuta basi perfecte truncata 1 mm. lata glabra apice intus breve corniculata. Stamina circ. 10, filamentis glabris filiformibus, antheris subcordatis minus 1 mm. longis,  $\frac{2}{3}$  mm. latis utrinque emarginatis. Styli 2 plus minus recurvati.

HAB. Tandalisan, Aprili. 1910, (Fl.).

**Hydrangea macrosepala** HAYATA sp. nov. Ramuli novelli glabri fusco-purpurascens. Folia lanceolata chartaceo-membranacea 8-8 $\frac{1}{2}$  cm. longa 22 mm. lata apice acuminata basi obtusa subintegra vel a medio sursum usque ad prope apicem minute remoteque serrulata, serrulis minutissimis  $\frac{1}{3}$  mm.

longis a se 7 mm. remotis, utraque pagine glabra subtus pallidiora, costis supra planis deorsum 1 mm. latis subtus elevatis, venis primariis tenuibus utroque latere costæ 5-6 elevatis, petiolis 8 mm. longis. Cymæ pseudoumbellatæ, sessiles, radiis 5, 3 cm. longis, pseudoumbellulis (cymulis) multifloratis. Fl. marginalis sterilis in cymula singula unus, pedicellis 2 cm. longis; sepala 4 obovato-orbicularia inæqualia, majora 27 mm. longa 23 mm. lata margine sub-integra vel repanda basi  $\pm$  unguiculata vel subito cuneata multi-nervia, nervis supra basin convergentibus, venulis tenuibus reticulatis. Flores fertiles: pedicelli  $\frac{1}{2}$  cm. longi tenuiter pubescentes; calycis tubus obconicus  $1\frac{1}{2}$  mm. longus 3 mm. latus, lobis 5 oblongo-triangularibus  $\frac{1}{3}$  mm. longis  $\frac{1}{2}$  mm. latis obtusis basi non contractis 1 mm. a se remotis; petala 5, obovato-oblonga  $3\frac{1}{2}$  mm. longa 2 mm. lata apice breve obtuseque cuspidata vel obtusa basi breve cuneata ad basin  $\frac{1}{3}$  mm. lata. Stamina 10, filamentis complanatis, antheris ovato-oblongis 1- $1\frac{1}{2}$  mm. longis. Ovarium semi-inferius, stylis 3 subrectis  $1\frac{1}{2}$  mm. longis.

HAB. Kōkei, leg. S. NAGASAWA, Aprili. 1903.

Near *H. chinensis*, but differs from it by the quite glabrous subentire leaves and much larger flowers.

**Hydrangea obovatifolia** HAYATA sp. nov. Rami cinerascetes sub-recti, ramulis novellis rubro-purpurascensibus. Folia coriacea obovata 5- $5\frac{1}{2}$  cm. longa  $2\frac{1}{2}$ -3 cm. lata apice triangulari-acuta basi obtusa margine supra basin usque ad infra apicem remote minuteque serrulata, (serrulis mucroniformibus  $\frac{1}{2}$  mm. longis 5-6 mm. a se remotis), prope basin et apicem integra supra viridia subtus pallidissima, (costis impressis, venis supra planis, subtus costis elevatis, venis primariis elevatis utroque latere costæ 4-5 a costa angulo 50° egressis, sursum arcuatis, venulis non conspicuis) facie supra plana subtus in exsiccato elevato-punctata, petiolis 1 cm. longis supra sulcatis anguste alatis basi  $\pm$  dilatatis. Cymæ subumbellatæ 4 cm. longæ 7-6 cm. latæ basi bracteis multiserratis suffultæ, (bracteis caducissimis oblongo-triangularibus 3-4 mm. longis 2 mm. latis dorso costatis), sessiles, radiis 5, 3 cm. longis, pseudo-umbellulis (cymulis)  $\infty$ -floratis. Flos marginalis sterilis (pedicellis  $1\frac{1}{2}$  cm. longis) in cymula singula unus; sepala 4, valde inæqualia

late orbicularia latiora quam longiora 15 mm. lata 13 mm. longa apice rotundata vel emarginata basi breve unguiculata minora rotundata 6 mm. in diametro, nervis basi omnibus connatis gradatim divergentibus. Flores fertiles: calycis tubus brevior  $\frac{1}{2}$  mm. longus obconicus, lobis 5 triangularibus  $\frac{1}{2}$  mm. longis totiusque latis. Petala oblonga 3 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusa basi late cuneata. Stamina 10,  $2\frac{1}{2}$  mm. longa, filamentis glabris  $\pm$  complanato-teretibus, antheris ovato-oblongis minus 1 mm. longis utrinque emarginatis. Ovarium fere superius cum stylis 2 mm. longum subconicum, stylis 4-3 1 mm. longis validiusculis apice stigmatoso-marginatis.

HAB. Monte Teraso, prope Kōshūn, leg. B. HAYATA et S. SASAKI, 1912, Juli.

Differs from *H. glabrijolia* by the obovate leaves and broadly rounded sepals of marginal flowers.

## Crassulaceæ.

### *Sedum* LINN.

***Sedum drymarioides*** HANCE; FORBES et HEMSL. Ind. Fl. Sin. I. p. 283.

HAB. Formosa: Loco non indicato, leg. U. FAURIE, 1903.

***Sedum erythrospermum*** HAYATA sp. nov. Herba annua? caulis gracilis, ramis divaricatis. Folia ternata vel opposita obovato-spathulata 8 mm. longa  $2\frac{1}{2}$  mm. lata apice obtusa deorsum attenuata basi  $\pm$  peltata, (partibus productis infra peltam  $\frac{1}{2}$  mm. longis), crassiuscula margine integra. Flores laxè cymosi sessiles sub flore singulo foliis 2-3 instructi. Sepala 5 viridissima linearia 2 mm. longa  $\frac{1}{2}$  mm. lata apice obtusa. Petala 5 lanceolata 5 mm. longa apice acuto-obtusa 3-nervia. Stamina 10. Carpella 5, in maturo divaricato-dehiscencia basi connata  $3\frac{1}{2}$  mm. longa 2 mm. lata apice rostrata, rostris 1 mm. longis. Semina ovoideo-ellipsoidea 1 mm. longa utrinque minute apiculata, testa membranacea rubra.

HAB. Monte Morrison, leg. U. MORI.



**Sedum obtuso-lineare** HAYATA sp. nov. Herba erecta, caules 12 cm. longi in exsiccatō 2 mm. lati. Folia irregulariter disposita alterna vel ternata linearia 7 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusa. Cymæ terminales  $1\frac{1}{2}$  cm. longæ 3 cm. latæ. Sepala 5 linearilanceolata 4 mm. longa  $1\frac{1}{3}$  mm. lata apice obtusa basi subpeltata ultra insertionem  $\frac{1}{4}$  mm. producta. Petala 5 ovato-lanceolata  $4\frac{1}{2}$  mm. longa 2 mm. lata apice obtusato-acuta ad summum obtusa basi plus minus angustata. Stamina 10. Carpella 5.

HAB. Fokien, leg. S. NAGASAWA, Aprili, 1910.

**Sedum microsepalum** HAYATA sp. nov. Caulis basi repens ad nodos radicans incrassatus sursum ascendens. Folia alterna spatulata 22 mm. longa 5 mm. lata apice obtusa basi attenuata crassiuscula glabra, (nervis non conspicuis), basi attenuata ad extremitatem rotundato-obtusa 2 mm. lata ultra insertionem  $\frac{1}{2}$  mm. producta. Flores cymosi sessiles, ramis divaricatis, bracteis oppositifoliis lanceolato-linearibus obtusis  $1\frac{1}{2}$  mm. longis basi dilatatis. Sepala 5 linearia, uno longissimo 4 mm. longo, alia breviora 2 mm. longa  $\frac{1}{2}$  mm. lata basi dilatata  $\frac{2}{3}$  mm. lata apice obtusa. Petala 5 basi connata ovato-lanceolata apice acuminata, basi non contracta 5 mm. longa 2 mm. lata apice minute brevique uncinato-cornuta dorso carinato-costata. Stamina 10, alia cum petalis opposita, alia cum iis alterna, circ. 4 mm. longa, filamentis complanatis. Glandulæ 5 cum petalis oppositæ  $\frac{1}{3}$  mm. longæ totiusque latæ emarginatæ. Carpella 5 intus a basi usque ad medium connata apice acuminata, ad stylos  $1\frac{1}{2}$  mm. longos abeuntia, cum stylos  $4\frac{1}{2}$  mm. longa.

HAB. Monte Morrison, Oct. 1908, leg. T. KAWAKAMI et U. MORI.

**Sedum Sasakii** HAYATA sp. nov. Herba; caulis longe prostratus, basi radices fibrosas emittens, gracilis non crassus tenuis teres  $\frac{1}{2}$  mm. in diametro, ramos erectos ascendentes emittens, ramis erectis 5-7 cm. longis sursum foliosis. Folia approximata imbricata alterna  $\pm$  crassa ovato-oblonga 3 mm. longa 2 mm. lata apice rotundata basi ultra insertionem producta, (partibus productis truncatis  $1\frac{1}{2}$  mm. latis  $\frac{1}{2}$  mm. longis peltatis) margine integra glabra sessilia. Flores sessiles spicatum 5-6 dispositi 3-4 mm. longi. Sepala 5

oblongo-linearia 3 mm. longa 1 mm. lata, apice rotundato-obtusa basi obtusa peltata, partibus productis  $\frac{1}{2}$  mm. longis. Petala 5, obovato-spathulata  $3\frac{1}{2}$  mm. longa  $1\frac{1}{2}$  mm. lata apice acuta basi  $\pm$  angustata medio 1-nervia. Stamina 10, episepala, altris epipetalis supra basin petali affixa, filamentis  $1\frac{1}{2}$  mm. longis, altris episepalis longioribus  $2\frac{1}{2}$  mm. longis, antheris ellipticis  $\frac{1}{2}$  mm. longis apice obtusis vel obscure obtusis. Carpella 5, basi connata, supra basin sursum libera elongato-ovata apice acuminata rostrata  $2\frac{1}{2}$  mm. longa, rostris  $\frac{1}{2}$  mm. longis. Carpella matura verticillatim patentia, late oblique triangularia  $1\frac{1}{2}$  mm. lata  $2\frac{1}{2}$  mm. longa apice rostrata. Semina flava, elliptica  $\frac{1}{2}$  mm. longa utrinque alis brevissimis producta.

HAB. In litore Denryōyō-sha et Shinsha, leg. S. SASAKI, Mai. 1912.

The habit of this plant is nearly the same as that of *S. uniflorum* Hook. f. et ARN., but the flowers are widely different.

**Sedum subcapitatum** HAYATA sp. nov. Herba perennis, caules erecti 14 mm. longi 4-gono-teretes. Folia alterna obovato-rotundata 28 mm. longa 20 mm. lata apice rotundata basi subito contracto-attenuata (partibus attenuatis 1-2 mm. longis), margine irregulariter subdenticulata vel subintegra in exsiccato coriacea vivo crassata subtrinervia, venulis longitudinaliter reticulatis. Flores capitato-umbellati, umbellis terminalibus simplicibus, radiis (pedicellis florum) 2 mm. longis. Sepala 5 linearia  $1\frac{1}{3}$  mm. longa apice obtusa. Petala oblonga  $3\frac{1}{2}$ -4 mm. longa  $1\frac{1}{2}$  mm. lata apice acuta deorsum  $\pm$  angustiora. Stamina 10. squamæ oblongæ emarginatæ  $\frac{2}{3}$  mm. longæ. Carpella 5 omnia soluta distincta lanceolato-fusiformia 3 mm. longa  $\frac{2}{3}$  mm. lata apice acuta ad stylum 1 mm. longum abeuntia basi attenuata deorsum  $\pm$  incurvata apice  $\pm$  recurvata subtriquetra dorso latereque costata interiore dihiscentia. Semina obovoideo-fusiformia cum alis  $1\frac{1}{3}$  mm. longa basi truncata apice alis  $\frac{1}{2}$  mm. longis terminata, facie minute longitudinaliter reticulata.

HAB. Monte Morrison, ad 13000 ped. alt., leg. U. MORI.

Very distinct for its subcapitate flowers.

## Droseraceæ.

*Drosera* LINN.

***Drosera peltata*** SM.; Forbes et HEMSL. Ind. Fl. Sin. I. p. 289.

HAB. Fokien: KOSAN, leg. S. NAGASAWA, Aprili. 1910.

DISTRIE. Tropical and subtropical Asia and Australia.

## Hamamelideæ.

*Eustigma* GARDN.

***Eustigma oblongifolium*** GARDN. et CHAMP. (Tab. XIX.) in BENTH. Fl. Hongk. p. 132; MATSUM. et HAYATA Enum. Pl. Formos. p. 137; HAYATA, Ic. Pl. Formos. II. p. 14. Arborescens? rami et ramuli rugosi cinerascens, sursum apice fuscentes lenticellis minutis punctati. Folia alterna oblonga vel oblongo-lanceolata 9-13 cm. longa 3-5 cm. lata apice acuminata vel caudata (caudibus acuminatis) basi obtusa vel acuta margine integra vel versus apicem utroque latere 1-2 dentibus instructa, (dentibus acutis ad apicem mucronatis), coriacea supra nitida subtus opaca, costis supra impressis subtus elevatis, venis primariis lateralibus utroque latere costæ 5-6 supra tenuissimis impressis subtus distincte elevatis a costa angulo 50-60° divaricatis, venis secundariis costa transverse dispositis vel inter venas primarias transversis subtus distinctis supra non conspicuis, petiolis 5-10 mm. longis supra subsulcatis, stipulis subulatis 4-5 mm. longis  $\frac{1}{2}$  mm. latis caducissimis facie concavo-sulcatis. Flores spicati, spicis terminalibus 2 cm. longis sessilibus vel breve pedunculatis stellato-tomentosis sub flore singulo 1-bracteatis et 2-bracteolatis, bracteis late rotundatis apice rotundatis basi leviter contractis 3-3½ cm. longis 4 mm. latis margine erosis vel integris extus pubescentibus intus glabris vel pubescentibus multinerviis, nervis radiato-parallelis, bracteolis cum bracteis conformibus tubum calycis arete attingentibus. Calycis tubus subsessilis campanulato-globosus 2-3 mm. longus extus pilis stellatis dense obtectus, limbo 5-lobato, lobis rotundato-oblongis valde reflexis 3-3½ mm.

longis  $2\frac{1}{2}$  mm. latis subintegris utraque pagine subglabris margine et basi leviter et paucissime pilis stellatis instructis multinerviis, nervis subparallelis. Petala 5, ad faucem tubi calycis affixa, cum lobis calycis alterna, cuneiformia in circumscriptione, 2 mm. longa apice truncata 2-lobata vel emarginata introrse recurvata crassiuscula extus sulcata intus costata vel deorsum angustata supra basin lateraliter compressa latere complanata ad basin  $\pm$  dilatata 1 mm. lata utraque pagine glaberrima. Stamina 5, ad basin lobi calycis affixa et iis opposita (episepala), antheris sessilibus vel subsessilibus ovato-rotundatis apice obtusis vel truncatis 1 mm. longis, longioribus quam latoribus, loculis introrsum valvis 2 medio solutis dehiscentibus. Ovarium inferius 2-loculare, loculis 1-ovulatis, ovulis pendulis anatropis; styli 2, in longitudine inæquales, longe exserti, altro 8 mm. longo, altro 12 mm. longo, erecti basi dense medio parce pilis stellatis obtecti, sursum subglabri, ad apicem dilatati tuberculati stigmatosi. Capsula lignosa ovoidea 13 mm. longa 10 mm. lata tenuiter 7-8-costata pilis stellatis oblecta, ad apicem truncata, basi ad stipitem incrassatum abeuns, sursum 2-valvatim loculicide dehiscens, deorsum indehiscens, valvis sursum solutis sed deorsum connatis, endocarpio apice soluto. Semina ovoideo-ellipsoidea 8-9 mm. longa 4-5 mm. lata leviter compressa facie subplana dorso convexa, utraque extremitate obtusa, testa glabra nigricanti submitida lignoso-crustacea; albumen carnosum; radícula supra brevis, cotyledonibus amplis oblongis 5 mm. longis 3 mm. latis, costis elevatis.

HAB. Nantō: Nankōkei, leg. U. MORI, 1908, Aug. (No. 1193); Jinrin, leg. U. MORI, 1910, Juli.; Hokkōkei, Shohakurin, Holisha, leg. C. ŌWATARI; R. KANAHIRA.

This plant seems slightly different from the species described in BENTH. Fl. Hongk. in having introrse anthers. It is widely distributed in Formosa.

## Halorageæ.

*Haloragis* FORST.

**Haloragis tetragyna** HOOK. f.; DUNN. Fl. Kwangt. et Hongk. p. 102.

*H. scabra* BENTH. Fl. Hongk. p. 139.

HAB. Fokien: Kosan, leg. S. NAGASAWA, Nov. 1909.

*Callitriche* LINN.

**Callitriche stagnalis** SCOP.; HAYATA Materials for a Flora of Formosa p. 111.

HAB. Ōkasaki, leg. T. SŌMA, Mart. 1912.

## Rhizophoreæ.

*Ceriops* ARN.

**Ceriops Candolleana** ARN. var. **Sasakii** HAYATA n. v. (Tab. XX.)  
Frutex. Rami glabri teretes, cicatricibus foliorum rotundatis notati, cortice subviridescenti. Folia opposita oblonga obovato-elliptica vel oblonga, coriacea 7 cm. longa 3 cm. lata apice rotundata sensim emarginata basi cuneata utraque pagine glabra supra nitida subtus pallida margine integra leviter desuper recurva, venis lateralibus supra  $\pm$  elevatis (in exsiccato) subtus inconspicuis rectis a costa angulo  $55^\circ$  divaricatis, venis primariis utroque latere costæ 10-13 prope marginem vena marginali connectis, costis utraque pagine elevatis, petiolis 2 cm. longis teretibus. Cymæ ad axillas foliorum superiorum solitariae subcapituliformes vel umbelliformes 5-6-floratae, pedunculis 1 cm. longis, pedicellis 1-2 mm. longis, vel floribus subsessilibus ad apicem pedunculorum 5 fasciculatis basi subconnatis, cupulam formantibus, bracteolis apice pedicellorum 2 basi connatis. Sepala 5 basi leviter connata valde crassa oblongo-lanceolata apice triangulari-acuta basi non contracta valvata 5 mm. longa 2 mm. lata erecta non patentia. Petala 5 sepalo breviora  $3\frac{1}{2}$  mm. longa  $1\frac{1}{2}$  mm. lata in ambitu oblonga apice emarginata ad centrum et utroque

latere apicis aristato-cornuta (cornibus 3 obtusis filiformibus  $\frac{1}{2}$  mm. longis), dorso medio costata basi cuneato-acuta ad marginem prope basin villosa. Stamina 10, filamentis  $1\frac{1}{2}$  mm. longis, antheris sagittato-lanceolatis  $\frac{2}{3}$  mm. longis apice apiculatis. Discus circa ovarium dispositus cupuliformis 10-dentatus, dentibus obtusis cum staminibus alternis. Ovarium semi-inferius superiore liberum, (parte libera conica 1 mm. longa totiusque lata), fere 3-loculare, loculis 2-ovulatis, stylo  $1\frac{1}{2}$  mm. longo columnari. Fructus maturi non visi.

HAB. Takao : Zenchinshō, leg. S. SASAKI, Nov. 1911.

Differs from the type in having quite glabrous style.

## Myrtaceæ.

### *Decaspermum* FORST.

***Decaspermum paniculatum*** KURZ. (Fig. 19); MATSUM. et HAYATA Enum. Pl. Formos. p. 144; HAYATA Ic. Pl. Formos. II. p. 18.

HAB. Kusukusu, leg. B. HAYATA et S. SASAKI, Juni. 1912.

### *Eugenia* LINN.

***Eugenia claviflora*** ROXB. var. ***oblongifolia*** HAYATA, n. v. Rami teretes, cortice rubescenti irregulariter fisso, ramulis tetragonis. Folia opposita chartacea oblonga ovato- vel obovato-lanceolata 6 cm. longa 2-2 $\frac{1}{2}$  cm. lata apice acuta ad summum obtusa basi breviter attenuata costa supra sulcata, subtus elevata, venis lateralibus primariis utroque latere costæ 20-30 tenuissimis impressis subtus tenuissime elevatis haud conspicuis, nervis marginalibus tenuissimis, petiolis 4-5 mm. longis supra sulcatis subteretibus. Flores ignoti. Fructus axillares solitarii breve pedicellati, (pedicellis  $\frac{1}{2}$  cm. longis), clavato-cylindracci, circ. 2 cm. longi 8 mm. lati, apice campanulati, basi attenuati, apice tubis calycum 8 mm. longis coronati.

HAB. Kōtōshō, leg. T. KAWAKAMI et S. SASAKI, Juni. 1912.

Differs from the type by the less acuminate obovate leaves.

***Eugenia cuspidato-obovata*** HAYATA sp. nov. Ramuli subtetragoni,



Fig. 19.

*Decaspermum paniculatum* Kunz. 1, a branch; 2, a leaf; 3, a flower; 4, a petal; 5, vertical section of an ovary; 6, 7, stamens, seen from different sides. Fig. 1 and 2,  $\times \frac{2}{3}$ ; fig. 3-7, magnified.

vel subteretes, cortice longitudinaliter fisso. Folia opposita obovato-cuspidata vel ovato-cuspidata  $5\frac{1}{2}$  cm. longa 27 mm. lata chartacea vel chartaceo-coriacea apice cuspidata ad apicem subacuta vel subobtusata basi cuneato-acuta margine integra, costa supra impressa sulcata subtus acuto-elevata, venis lateralibus supra planis subtus obscure tenuissime elevatis prope marginem vena marginali connectis, petiolis  $\frac{1}{2}$  cm. longis supra sulcatis subtus acute costatis. Flores ignoti. Fructus depresso-globosi 6 mm. longi 12 mm. lati apice depresso-impressi basi rotundati in exsiccato-rugosi.

HAB. Kōtōshō, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912.

Near *Eugenia acuminatissima* KURZ., but differs from it by the broader cuspidate leaves.

***Eugenia densissima* MERRILL.**

Compared with a specimen from the Philippines.

HAB. Kōtōshō, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912.

***Eugenia? divaricato-cymosa* HAYATA sp. nov.** Rami teretes, cortice cinerascens, lenticellis non distinctis. Folia lanceolata 19 cm. longa  $5\frac{1}{2}$  cm. lata apice acuminata ad summum obtusa basi cuneato-attenuata chartacea margine subintegra vel minute denticulata, costa supra late impressa subtus elevata venis lateralibus primariis utroque latere costæ 12–13 subrectis a costa angulo  $50^\circ$  egressis prope marginem subito flexuosis ad venam proximam superiorem attingentibus subtus tenuiter elevatis supra tenuiter elevatis vel impressis, venulis secundariis grosse reticulatis subtus tenuiter elevatis, breve petiolata, petiolis 2 cm. longis laminam  $\frac{1}{10}$ -plo æquantibus subteretibus supra leviter sulcatis. Cymæ axillares 10 cm. longæ 10 cm. latæ 3–4-plo ramosæ, ramis laxis angulo obtuso divaricatis suboppositis, floribus ad apicem ramulorum subternatim dispositis sessilibus. Alabastrum florum turbinatum 6 mm. longum 4 mm. latum apice aristato-aculeatum basi subito attenuatum. Calyx-tubus late campanulatus 4 mm. longus 6 mm. latus apice truncatus, ore integro (partibus ovario adnatis brevissimis  $1\frac{1}{2}$  mm. longis), limbo 4-lobato, lobis connatis mitram aristato-apiculatam formantibus. Petala 4 late oblonga 4 mm. longa apice rotundata vel subacuta margine erosa ad basin  $1\frac{1}{2}$  mm. lata



tenuissima utraque pagine globuloso-punctata hyalina. Stamina  $\infty$ , filamentis crispatis 4–5 mm. longis, antheris oblongo-cordatis apice connectivo globuloso terminatis basi 2-lobatis. Ovarium inferius 1– $\frac{1}{2}$  mm. longum 2-loculare, loculis multi-ovulatis, stylo columnari-filiformi 7 mm. longo apice obtuso-punctato.

HAB. Hainan, leg. N. KONISHI, Juni. 1909.

Near *E. similis* MERR., but differs from it by the longer leaves with fewer lateral veins.

**Eugenia euphlebia** HAYATA sp. nov. Ramuli subteretes vel subtetragoni, (cortice longitudinaliter fissi), subcinerascentes glabri. Folia obovata, 5 cm. longa 2 cm. lata apice cuspidata ad summum obtusa basi cuneata ad petiolum abeuntia coriacea integra (costa supra impressa subtus elevata, venis lateralibus supra non conspicuis subtus tenuiter elevatis rectis prope marginem nervo marginali connectis), subtus minute nigro-punctata supra nitida subtus pallidiora, petiolis 1 cm. longis. Cymæ terminales paucifloratæ 2–3-chotome ramosæ, ad apicem ramulorum floribus 2–3 sessilibus. Calyx-tubus urceolato-campanulatus 3 mm. longus, (ore 3 $\frac{1}{2}$  mm. lato), ultra ovarium 2 mm. productus, limbo 4-dentato, dentibus latissimis 2 mm. latis  $\frac{1}{2}$  mm. longis obtusissimis. Petala 4 late orbicularia 3 mm. lata 2 $\frac{3}{8}$  mm. longa margine subintegra basi ad insertionem 1 mm. lata. Stamina  $\infty$ , filamentis 3–5 mm. longis, antheris subcordatis  $\frac{1}{2}$  mm. longis apice subrotundatis. Stylus columnari-filiformis 6 mm. longus apice obtusus. Ovarium inferius 2-loculare.

HAB. Kusukusu, leg. B. HAYATA et S. SASAKI, Juli. 1912.

**Eugenia fluviatilis** HEMSLE in FORBES et HEMSLE Ind. Fl. Sin. I. p. 296.

HAB. Hainan, leg. N. KONISHI, 1910, Juni.

**Eugenia kusukusensis** HAYATA sp. nov. Arborescens. Rami teretes, cortice rubescenti vel cinerascenti. Folia opposita oblonga obovato- vel ovato-oblonga vel ovato-lanceolata 9 cm. longa 3 $\frac{1}{2}$  cm. lata apice cuspidato-acuminata ad summum obtusa basi acuto-attenuata margine integerrima chartacea, (costa supra sulcata subtus elevata, venis lateralibus primariis tenuissimis utraque pagine distincte tenuissime elevatis prope marginem

vena marginali connectis), supra parce subtus dense sub lente punctata, petiolis 1 cm. longis. Cymæ dense floratæ 4 cm. longæ 6 cm. latæ, ramis oppositis angulo obtuso divaricatis, floribus ad apicem ramulorum 3–4-natis sessile vel pedicellatim dispositis, pedicellis ultimis 2 mm. longis. Calyx-tubus late campanulatus 3 mm. longus 5 mm. latus ore suberoso. Petala connata non distincte visa. Stamina  $\infty$ , filamentis filiformibus 1 mm. longis, antheris oblongis late globosis  $\frac{1}{2}$  mm. longis subcordatis apice intus connectivis globuliformibus terminatis. Ovarium inferius ad basin tubi calycis situm 1 mm. longum.

HAB. Kusukusu, leg. B. HAYATA et S. SASAKI, Juni. 9, 1912.

Near *Eugenia Millettiana* HEMSL. but differs from it by the densely flowered cymes and leaves.

## Melastomaceæ.

### *Melastoma* BURM.

**Melastoma sanguineum** SIMS. Bot. Mag. t. 2241; FORBES et HEMSL. Ind. Fl. Sin. I. p. 300.

HAB. Hainan, leg. N. KONISHI, 1909, Juni.

**Melastoma tetramerum** HAYATA, sp. nov. Rami et ramuli tereto-tetragoni pilis adpressis strigosis obtecti, cortice fusco-rubescenti demum gradatim soluto. Folia opposita ovato-elliptica vel oblonga 4 cm. longa  $1\frac{1}{2}$  cm. lata chartacea apice acuta basi obtusa margine integra supra adpresse regulariter pilosa subtus dense adpresse pilosa distincte 3–nervia, prætera 2–marginalibus tenuibus instructa, nervis omnibus subparallelibus deorsum  $\pm$  divergentibus sursum convergentibus ad apicem foliorum attingentibus supra subimpressis subtus elevatis dense adpresse pilosis, petiolis 7 mm. longis supra sulcatis subteretibus. Flores ad apicem ramulorum axillarium solitarii vel terminales, pedunculis 1–2 cm. longis. Calyx-tubus globoso-urceolatus 7 mm. longus latior quam longior extus adpresse pilosus basi rotundatus, ore plus minus contracto, limbo 4-lobato, lobis triangulari-lanceolatis

12 mm. longis basi latissimis 5 mm. latis extus adpresse strigo-o-pilosis intus glabris, sed sursum adpresse pilosis. Petala 4 obovato-rotundata 22 mm. longa 18 mm. lata apice rotundata basi contracto-unguiculata, (unguibus 2 mm. longis), margine sub lente minute ciliolata. Stamina 8, iis cum petalis alternis longioribus, iis cum petalis oppositis brevioribus; stamina longiora: filamentis 7 mm. longis complanatis 1 mm. latis cum connectivis angulo recto articulatis, connectivis basi antheræ longe productis (partibus productis 9 mm. longis 1 mm. latis complanatis prope basin cum filamentis articulatis) basi facie 2-cornuto-calcaratis, calcaribus obtusis 2-cornutis 1 mm. longis, antheris linearibus complanatis 7-8 mm. longis basi  $1\frac{1}{2}$  mm. latis apice obtusis basi 2-lobatis facie undulatis dorso planis apice 1-porosis; stamina breviora: filamentis  $6\frac{1}{2}$  mm. longis complanatis cum connectivo angulo recto articulatis, connectivis ultra basin antheræ productis, partibus productis 1 mm. longis recurvis basi facie 2-cornuto-calcaratis, antheris ovato-linearibus 6 mm. longis basi  $1\frac{1}{2}$  mm. latis apice obtusis basi 2-lobatis facie transverse undulato-rugosis. Ovarium ovato-globosum 5 mm. longum cum calyceis tubo adnatum sursum liberum strigoso-tomentosum apice ad centrum stylum elongatum emittens, 4-loculare, loculis  $\infty$ -ovulatis, stylo columnari-filiformi 18 mm. longo apice truncato obtuso.

HAB. Bonin: Chichijima-Hatsunejima, Juli. 1905, leg. H. HATTORI.

Very distinct for its tetramerous flowers and its leaves which are much smaller than those of any species of the genus.

### *Bredia* BLUME.

**Bredia Oldhami** HOOK. f. (Fig. 20.); HAYATA Ic. Pl. Formos. I. p. 24.

**Bredia scandens** HAYATA (Tab. XXI.), Ic. Pl. Formos. I. p. 24. Suffrutex scandens vel erecta circ. 1 mm. longa, caulis subteres vel subtetragonus in vivo purpureo-rubescens, in exsiccato nigricans, patento-hirsutus, (pilis transverse patentibus), 2-2 $\frac{1}{2}$  mm. in diametro sectionis, pauci-ramosus. Folia opposita longe petiolata ovato-cordata 7 $\frac{1}{2}$  cm. longa 4 $\frac{1}{2}$  cm. lata apice acuminata vel ad summum obtusa ad centrum minute mucronata margine subintegra et mucronato-denticulata, (dentibus mucroniformibus brevissimis



Fig. 20.

*Bredia Oldhami* Hook. f. 1, a branch; 2, a flower, stamens and petals taken off; 3, a petal; 4, 5, 6, stamens of one kind, seen from different sides; 7, 8, 9, stamens of the other kind, seen from different sides; 10, an ovary, in vertical section; 11, 12, seeds, seen from different sides. 1,  $\times \frac{2}{3}$ ; 2-12 more or less magnified.

$\frac{1}{8}$  mm. longis 1–2 mm. a se distantibus), vel in folio novello ciliolata, basi cordata vel acuta chartacea supra toto glabra subtus ad nervos venasque tenuiter pubescentia supra subviridia subtus pallido-purpurascens 7-nervia, nervis versus utrasque extremitates convergentibus, venis secundariis inter nervos transversis venulis reticulatis, nervis et venis supra planis subtus prominentibus, petiolis  $3\frac{1}{2}$ –4 cm. longis lamina  $\pm$  brevioribus stipulatis. Cymæ vel paniculato-cymæ terminales 7 cm. longæ 5 cm. latæ, ramis oppositis. Flores subdeclinati, pedicellis breve denique pubescentibus, pilis glandulosis apice globuliferis. Calyx-tubus obconico-tetragonus basi gradatim attenuatus ad pedicellum abeuns 4 mm. longus totiusque latus, limbo 4-lobato, lobis late triangularibus vel subcuspidiformibus 2 mm. longis sinibus inter lobos latis rotundatis cum tubo extus glanduloso-pubescentibus. Alabastrum floris tetragono-ovoideo-fusifforme apice acutum. Petala 4, 2-superiora minora, 2-inferiora majora, albo-purpurea oblique rotundato-ovata circ. 8 mm. longa totiusque lata apice rotundato-acuta subcalloso-mucronata basi lato-truncata ad insertionem contracta  $\frac{1}{2}$  mm. lata margine integra, (nervis et venis grosse reticulatis), extus  $\pm$  pubescentia intus glabra. Stamina 8, ad faucem tubi calycis affixa, eâ lobis calycis opposita longiora, eâ lobis calycis alterna breviora, declinata; stamina longiora valde declinata purpurascens filamentis complanatis 8 mm. longis glabris, antheris linearibus cum tubo 7 mm. longis deorsum  $\pm$  latioribus sursum angustissimis apice in tubum 1 mm. longum 1-porosum abeuntibus, basi in auriculaum 2-lobatum 1 mm. longum cum filamentis connatum productis, toto glabris; stamina breviora  $6\frac{1}{2}$  mm. longa, filamentis 3 mm. longis complanatis glabris, antheris albicantibus lineari-fusifformibus 3 mm. longis basi latioribus apice in tubum 1 mm. longum 1-porosum attenuatis, basi antice breve 2-auriculatis (auriculis liberis  $\frac{1}{2}$  mm. longis postice brevissime 1-calcaratis vel obscuris. Ovarium apice in tubum 1 mm. longum margine ciliolato-denticulatum  $1\frac{1}{2}$  mm. latum productum. Stylus columnaris  $4\frac{1}{2}$  mm. longus apice obtuso-truncatus. Capsula loculicide dehiscens tetragono-obconica, lobis calycis persistentibus; tubus partis productæ ovarii in fructu late campanulato-patelliforme expansus apicem fructus coronans. Semina scobiformia oblique angulato-ovoidæ  $\frac{1}{2}$  mm. longa testa elegante

verrucosa latere uno et utraque extremitate breve subalata facie globulis minutis dense dispersa.

HAB. Ubique in montibus 2000-3000 ped. alt.; inter Karapin et Funkiko, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Very near *Bredia hirsuta* BLUME but distinguishable by the longer anthers, longer styles and especially by the absence of dorsal tubercles at the base of the longer anthers.

*Sarcopyramis* WALL.

***Sarcopyramis delicata*** C. B. ROBINSON, in Bull. Torr. Bot. Club. 35 (1908) pp. 72 et 75, et in Philip. Journ. Scien. (1910) p. 368.

*Sarcopyramis nepalensis* HAYATA Fl. Mont. Formos. p. 98; Ic. Pl. Formos. II. p. 24, (non WALL.)

Compositæ.

*Eupatorium* LINN.

***Eupatorium gracillimum*** HAYATA sp. nov. Rami rubescentes glabri minute longitudinaliter striati, ramulis gracillimis teretibus remote foliatis, foliis a se 4 mm. remotis. Folia opposita triangulari-oblonga vel triangularia in circumscriptione, 3-3½ cm. longa 2 cm. lata apice caudato-acuminata basi late truncata vel rotundato-truncata margine dentato-serrata, (dentibus ascendentibus obtusis), prope basin subintegra basi ad extremitatem plus minus acuta membranacea utraque pagine minute pubescentia 3-nervia vel 5-nervia, petiolis 4 mm. longis. Capitula dense cymosa, cymis 5-7 cm. longis 3-5 cm. latis terminalibus ramosis, ramis angulo obtuso divaricatis capitulis dense dispositis, pedicellis brevibus 1 mm. longis vel longioribus, ramis et ramulis dense pubescentibus, bracteis minutis linearibus vel oblongis 1 mm. longis obtusis tenuiter pubescentibus. Involucri cylindracei 4½ mm. longi 2 mm. lati, bracteis 7-10 extimis minoribus interioribus longioribus intimis longissimis, extimis ovatis obtusis margine ciliolatis 1 mm. longis intimis spathulato-linearibus 3½ mm. longis 1 mm. latis apice

obtusis margine minute ciliolatis extus superiore pubescentibus cæterum glabris. Flores in capitulum singulum 5, cum stylo 7 mm. longi. Corolla cylindrica 3 mm. longa apice latiora basi attenuata apice 5-loba, lobis brevibus  $\frac{1}{3}$  mm. longis triangularibus erecto-patentibus dorso minute glanduloso-punctatis. Antheræ  $1\frac{1}{4}$  mm. longæ apice appendiculatæ basi obtusæ. Rami styli longe exserti corollam in longitudine æquantes; styli basi leviter dilatati (partibus dilatatis apice dense barbatis, barbis rubris) ad extremitatem contracti cum stylophoris articulati. Ovarium clavato-lineare. Setæ pappi albæ 2-seriatæ 3 mm. longæ scabræ.

HAB. Kōshūn: Kuraru et Kusukusu, leg. B. HAYATA et S. SASAKI, Juni. 1912.

Near *E. Tashiroi* HAYATA; but differs from it by the much more deeply dentate leaves, more slender habit, and after all by the barbate base of the styles.

## Vacciniaceæ.

### *Vaccinium* LINN.

***Vaccinium bracteatum*** THUNB.; FORBES et HEMSL. Ind. Fl. Sin. II. p. 14: MATSUM. Ind. Pl. Jap. II. p. 466.

HAB. Hokuto, T. KAWAKAMI! 1913.

DISTRIB. China, Japan and Eastern India.

This is the first record of the species from Formosa which is represented by a specimen exactly like the Japanese. That plant which was recorded from the island by Dr. A. HENRY and enumerated by myself in our previous works is perhaps not the same as the Japanese. Here is another specimen which has a rather different aspect from the type. But, so far as floral parts are concerned, it may be probably referable to the same species or may be a variety of it.

var? Folia oblonga vel ovato-oblonga vel rhomboideo-oblonga usque ad  $3\frac{1}{2}$  cm. longa 18 mm. lata utrinque acuta margine serrulata, (costis et venisque supra planis, subtus prominente distincteque elevatis), prope basin margine integra petiolis brevibus 2-3 mm. longis. Bracteæ oblongo-lanceolatæ multo minores quam iis specierum Japonicarum, 3 mm. longæ, pubescentes, bracteolis

linearibus 2 mm. longis. Calycis tubus 1 mm. longus, lobis acutis pubescentibus. Corolla tubulosa extus pubescens apice urceolata 5 mm. longa 3 mm. lata apice 5-lobata, lobis recurvis. Stamina 10, filamentis basi barbatis, antheris linearibus 2 mm. longis, loculis supra basin sursum distinctis, ecalcaratis.

HAB. Poroporosha, leg. U. MORI, Juni. 1912.

**Vaccinium bracteatum** THUNB. var. **longitubum** HAYATA n. v. Rami teretes graciles cinerascens. Folia alterna coriacea obovato-oblonga vel obovato-rhomboides apice acuto-acuminata vel breviter acuminata basi acuta vel acuto-attenuata usque 5 cm. longa 2 cm. lata margine obscure vel tenuissime serrulata vel crenulata, (costis supra tenuiter elevatis subtus prominentibus, venis primariis lateralibus supra non visis subtus distincte elevatis), supra nitentia subtus pallida ad costas remote glanduloso-punctata. Racemi axillares vel terminales usque ad 3 cm. longi, floribus patentibus interdum subnatis subsecundis, pedicellis 1-2 mm. longis, bracteis et bracteolis multo minoribus quam iis speciei typicæ, rhachidibus et pedicellis toto pubescentibus, bracteis angustatis 2 mm. longis  $\frac{2}{3}$  mm. latis acutis pubescentibus, bracteolis 2 elongato-triangularibus 1 mm. longis pubescentibus. Calycis tubus globoso-campanulatus 1 mm. in diametro vel latior pubescens latere rarius glandula 1 instructus, (glandulis rotundatis cupuliformibus), interdum eglandulosus, limbo 5-dentato, dentibus remotis inter se  $\frac{2}{3}$  mm. latis triangularibus  $\frac{1}{2}$  mm. longis. Corolla cylindracea apice tubi plus minus contracta 8 mm. longa 2½ mm. lata, tubo extus pubescenti intus deorsum hirsuto sursum glabro, limbo brevissimo 1 mm. longo 5-lobato, lobis triangularibus 1 mm. longis totiusque latis apice obtusis reflexis. Stamina 10, 2-seriatim disposita, iis lobis corollæ alternis longioribus, iis lobis corollæ oppositis brevioribus, 5-6 mm. longis, filamentis 3 mm. longis complanatis basi barbatis, antheris linearibus cum tubo loculi 2-3 mm. longis apice in tubos 2 distinctos circ. 2 mm. longos productis ecalcaratis. Ovarium inferius 5-loculare? apice barbis erectis dense obtectum. Styli columnares 7 mm. longi 5-angulati ad angulos subalati apice truncati stigmatosi.

HAB. Montibus in Nantō, leg. U. MORI, Juli. 1909.

Differs from the type in having much longer corolla-tubes.



**Vaccinium caudatifolium** HAYATA sp. nov. (Tab. XXII.) Frutex epiphytica usque 1 mm. alta. Rami cinerascens glabri longitudinaliter rugosi lenticellis parce notati recti, ramulis parcissime hirsutis. Folia alterna chartacea vel chartaceo-coriacea vel coriacea ovato-lanceolata vel ovato-oblonga usque 9 cm. longa  $2\frac{1}{2}$ –3 cm. lata apice acuminata vel caudato-acuminata (caudibus interdum linearibus) basi obtusa acuta ad extremitatem subto attenuata ad petiolum brevem abeuntia margine integerrima leviter desuper recurvata vel non recurvata supra viridia nitida subtus opaca pallidissima, (costa tenui utraque pagine elevata, venis lateralibus primariis supra tenuissime distincteque elevatis subtus obscuris non visis utroque latere costæ 5–7 angulo acuto a costa divaricatis), petiolis brevissimis 3 mm. longis complanatis subalatis. Alabastrum racemi axillare ovoideum 1– $1\frac{1}{2}$  cm. longum perulis multis obtectum, perulis caducissimis, extimis minimis cuspidato-triangularibus margine ciliolatis coriaceis sterilibus, interioribus magnis ovato-cuspidatis apice margine revolutis medio coriaceis, margine tenuibus ciliatis sterilibus, intimis tenuioribus involventibus racemum amplexantibus. Racemi apertientes  $1\frac{1}{2}$ –2 cm. longi petiolum duplo vel triplo in longitudine æquantes 10- vel pauciore-florati glabrati sub-sessiles, sub pedicello singulo 1-bracteati et 2-bracteolati, bracteis ovato-cuspidatis (cuspidibus reflexis) 8 mm. longis 5–6 mm. latis glabris margine ciliolatis, bracteolis linearibus 6 mm. longis 1 mm. latis apice cuspidatis reflexis margine longe ciliatis. Flores apertientes non visi, in alabastro 7 mm. longi pedicellati, pedicellis 2–3 mm. longis glabris apice  $\pm$  annulariter dilatatis cum calyce floris articulatis. Calycis tubus urceolato-campanulatus  $1\frac{1}{2}$  mm. longus 5-lobatus, lobis elongato-triangularibus  $2\frac{1}{2}$  mm. longis basi  $1\frac{1}{2}$  mm. latis apice acutis. Corolla in alabastro oblongo-conica 5 mm. longa 3 mm. lata extus glabra intus sursum hirsuta. Stamina 10, 5 mm. longa filamentis 2 mm. longis barbatis complanatis, antheris cum tubis 4 mm. longis linearibus apice in tubos 2 distinctos  $2\frac{1}{2}$  mm. longos productis apice tubi introrse 1-porosis (poris linearibus 1 mm. longis) basi tubi dorso 2-calcaratis, calcaribus superne recurvis circ. 1 mm. longis ab anthera angulo recto divaricatis. Stylus columnaris 4 mm. longus. Ovarium inferius 10-loculare. Racemi fructiferi  $2\frac{1}{2}$  cm. longi. Bacca urceolato-globosa 6 mm. longa 5 mm. lata apice

contracta, calycis lobis persistentibus coronata, ad summum leviter depressa, atro-rubra vel purpureo-rubra glabra. Semina elongato-ellipsoidea leviter obliqua elegante reticulata  $1\frac{1}{2}$  mm. longa  $\frac{2}{3}$  mm. lata utraque extremitate maculato-fuscentia, testa membranacea; embryo cylindricus 1 mm. longus teres, cotyledonibus parvis radícula æquilatis.

HAB. Baatankei, leg. U. MORI, Juli. 1912; Montibus Arisan: Nim-andaira, ad truncos *Querci* sp. Jan., 1912, leg. B. HAYATA et S. SASAKI.

Near *Vaccinium urceolatum* HEMSL. (in Ind. Fl. Sin. II. p. 16.), but differs from that in the leaves which are in the new species acute or obtuse at the base.

**Vaccinium parvibracteum** HAYATA sp. nov. Rami vel ramuli graciles cinerascens. Folia ovato-oblonga vel oblonga usque 8 cm. longa 3 cm. lata apice acuminata ad summum aristata basi obtusa rotundata coriacea subtus ad costam remote glanduloso-punctata margine minute mucronato-serrulata, (serrulis vel mucronibus brevissimis a se 2–3 mm. remotis ascendento-recurvis), (costis et venis supra planis subtus distincte elevatis, venis lateralibus primariis utroque latere costæ 9–10 angulo 60° divaricatis) subtus pallida, petiolis brevissimis 3 mm. longis. Racemi axillares vel terminales 7–8 cm. longi divaricati ascendentes a supra basin usque ad apicem floriferi, perulis basi racemorum 5–6 fuscento-rubris rotundato-triangularibus 2 mm. longis totiusque latis vel latioribus apice breve cuspidatis margine erosis, bracteis sub pedicello singulo singulis ovato-rhomboideis concavis 3–4 mm. longis  $2\frac{1}{2}$  mm. latis glabris dorso obscure costatis (costis apice ad cuspidem brevem  $\frac{1}{3}$  mm. longam abeuntibus) apice acutis basi infra medium subito cuneato-angustatis basi 1 mm. latis margine eroso-denticulatis parte cuneata basilari integris utraque pagine glabris, bracteolis 2 ad pedicellos remote sitis cuspidato-ovato-rhomboideis  $1\frac{1}{2}$  mm. longis  $\frac{3}{4}$  mm. latis apice cuspidatis basi cuneatis basi  $\frac{1}{2}$  mm. latis margine utroque latere 1–2 dentibus instructis utraque pagine glabris, pedicellis 2–3 mm. longis divaricatis descendento-recurvis apice cum calyce articulatis, floribus erectis vel nutantibus subsecundis. Calyx late campanulatus  $2\frac{1}{2}$  mm. longus 3 mm. latus, tubo late obconico 1 mm. longo, limbo 5-lobato, lobis majoribus late triangularibus vel rotundato-triangularibus  $1\frac{1}{2}$  mm. longis totiusque latis apice acutis vel breve cuspidatis margine eroso-integris. Corolla

apertiens non visa, in alabastro oblonga utraque glabra apice acuta 7 mm. longa 4-4½ mm. lata, tubo 6 mm. longo, lobis 1 mm. longis obtusis triangularibus clausis. Stamina 10, 5 mm. longa, filamentis 2 mm. longis barbatis, antheris linearibus (cum tubo) 3 mm. longis basi 2-lobatis apice in tubos 2 distinctos 2 mm. longos productis apice tubi introse 1-porosis, (poris obliquis elongatis ½ mm. longis) dorso basi ad insertionem filamentorum 2-calcaratis, (calcaribus setosis ascendentibus 1 mm. longis vel longioribus sub lente minute aristato-punctatis), facie sub lente minute aristato-punctatis. Ovarium semi-inferius, superiore semiglobosum elevatum sursum 10-loculare, (ovulis in loculo 1-seriatim dispositis), medio et deorsum 5-loculare, (ovulis loculo 2-seriatim dispositis) apice glabrum, stylo columnari 6 mm. longo glabro apice truncato.

HAB. Fokien: Mt. Kosan, leg. S. NAGASAWA, Aprili. 1910. (No. 234.)

Near *V. Donianum* WIGHT, var. *hangchowense* MATSUDA, but differs from it by the much smaller bracts ad bracteoles and much longer spurs of the anthers.

**Vaccinium randaiense** HAYATA Mater. Fl. Formos. p. 168. Descriptio auctata: Corolla cylindrica 6 mm. longa 3 mm. lata extus intusque glabra, limbo brevissimo 5-lobato, lobis rotundatis 1 mm. longis totiusque latis extrorse recurvis. Fructus uceolato-globosus 5-6 mm. in diametro exsiccato fusco-flavesceus. Semina oblique elliptica 1½ mm. longa 1 mm. lata plus minus complanata vel irregulariter angulata, testa obscure reticulata flavescenti.

Described from a specimen collected by Mr. T. DOI in April, 1912, in the experimental Forest in Formosa.

## Ericaceæ.

### *Rhododendron* LINN.

**Rhododendron breviperulata** HAYATA sp. nov. Rami graciles recti pilis squamiformibus dense obtecti cicatricibus foliorum obtriangularibus notati. Folia oblonga vel rarius ovato-oblonga vel obovato-oblonga medioeria 3 cm. longa 13 mm. lata chartacea apice obtusa ad summum callosio-apiculata

basi obtusa sed ad extremitatem abrupte attenuata ad petiolum abeuntia, supra parce scabra adpresse hirsuta subtus adpresse hirsuta, pilis ad paginam superiorem brevioribus, iis ad paginam inferiorem longioribus supra costis et venis planis venis reticulatis impressis, subtus costis et venis tenuiter elevatis pilis dense obtectis venis reticulatis non elevatis sed conspicuis, facie supra fuscentia, subtus pallidiora. Flores sæpe geminatim vel ternatim ad apicem ramulorum terminales, perulis brevibus involuerati, perulis late ovatis apice cuspidatis margine ciliatis extus medio hirsutis intus glabris, pedicellis 6 mm. longis dense hirsutis. Calyx 5-partitus, segmentis oblongo-rotundatis  $1\frac{1}{2}$  mm. longis 1 mm. latis margine longe ciliolatis intus glabris extus dense hirsutis, pilis 2 mm. longis rectis. Corolla infundibuliformis  $1\frac{1}{2}$  cm. longa vel longiora 5-lobata. Stamina filamenta inæqualia cir. 18 mm. longa deorsum parcissime hirsuta, antheris oblongo-linearibus  $1\frac{2}{3}$  mm. longis  $\frac{2}{3}$  mm. latis apice truncatis 2-porosis 2-lobatis basi acutis apiculatis. Ovarium ovoideo-conicum  $1\frac{1}{2}$  mm. longum pilis longiusculis rectis dense obtectum, stylis 2 cm. longis basi hirsutis apice dilatatis, stigmatibus terminalibus.

HAB. Nantō, Mt. Pusasai, leg. U. MORI, 1909, Aprili.

Remarkable for the styles which are pilose at the base and dilated at the apex and oblong linear anthers which are apiculated at the base.

**Rhododendron caryophyllum** HAYATA sp. nov. (Tab. XXIII.) Frutex.

Rami cinerascetes ternatim ramosissimi, ramulis ternatis sursum squamis lanceolato-triangularibus  $1\frac{1}{3}$  mm. longis dense obtectis, cicatricibus obtriangularibus 1 mm. latis approximativè notatis. Folia ut videntur subpersistencia versus apicem ramulorum approximativè alternativè disposita ovato-oblonga 2 cm. longa vel longiora 1 cm. lata vel latiora coriacea margine integra desuper recurva supra scaberrimo-hispidula, subtus adpresse strigoso-pilosa, (pilis longiusculis circ. 1 mm. longis densiusculis, iis ad costas latiusculis subsquamæformibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis), (costis venis venulisque supra impressis distinctis reticulatis, areolis intra reticula elevatis, subtus costis prominente venis tenuiter elevatis venulis ultimis distincte minute reticulatis  $\pm$  impressis, areolis intra reticula elevatis) apice obtusa ad centrum breve

calloso-mucronato-apiculata basi obtusa, petiolis 4 mm. longis semi-teretibus supra planis, pilis squamæformibus obtectis. Alabastrum florum perulis obtectum, perulis extimis minoribus, medionis magnis late rotundatis 7 mm. longis 1 cm. latis alabastrum florum perfecte amplexantibus margine ciliatis intus glabris extus pilosis, intimis angustioribus spathulatis 7 mm. longis basi attenuatis apice obtusis intus glabris extus adpresse longe denseque pilosis. Flores ad apicem ramulorum terminaliter 2-3-aggregati, pedicellis 4 mm. longis pilis squamæformibus dense obtectis. Calyx 5-lobatus, lobis rotundato-oblongis utrinque obtusis margine longe ciliatis (ciliis  $1\frac{1}{2}$  mm. longis) intus glabris extus pilis squamæformibus dense obtectis. Corolla 12 mm. longa 7 mm. lata leviter declinata vel suberecta, lobis 5 subpatentibus vel suberectis oblongis 7 mm. longis 5-6 mm. latis apice obtusis vel rotundatis, duobus medio purpureo-punctato-maculatis, utrinque glabris. Stamina 10 inæqualia, filamentis 8-13 mm. longis inferiore parce hirsutis superiore glabris complanatis, antheris rotundato-obcordatis  $1\frac{1}{2}$  mm. longis 1 mm. latis apice 2-lobatis basi obtusis leviter emarginatis 2-porosis. Ovarium globoso-conicum 2 mm. longum totiusque latum, pilis latiusculis dense obtectum, stylo plus minus declinato 12 mm. longo basi usque ad medium longe piloso superiore glabro, stigmate terminali  $\pm$  dilatato.

HAB. In Montibus Centralibus, leg. U. MORI, 1909.

**Rhododendron** (*Eurhododendron*) **ciliato-pedicellatum** HAYATA sp. nov. Rami cinerascens glabri. Folia ad apicem ramorum approximativè sita obovato-oblonga 10 cm. longa 4 cm. lata supra medium latissima apice brevè acuminata ad summum angustissime subaristata basi obtusa vel obtuse acuta utraque facie glabra supra in speciminibus nostris glauciuscula subtus opaca pallidissima, (costis supra impressis subtus prominentibus, venis utraque facie tenuiter elevatis) subtus distincte laxè reticulata tenuiter coriacea vel coriaceo-chartacea, (venis et venulis subtus rubescentibus), margine integerrima leviter desuper recurva, petiolis 2 cm. longis supra angustissime sulcatis glabris apice angustissime alatis. Flores ad apicem ramorum sensu stricto 3-5-fasciculati, fasciculo solitario terminali multi-perulato, perulis extimis late obovatis minutis, interioribus majoribus obovato-spathulatis circ. 3 cm. longis, intimis

longissimis  $3\frac{1}{2}$  cm. longis 5 mm. latis spathulato-linearibus apice obtusis, omnibus apice dense ciliatis castaneis glabris vel subglabris margine sursum denticulatis, bracteolis lineari-filiformibus  $2\frac{1}{2}$ –3 cm. longis apice dense ciliatis, pedicellis 2 cm. longis glanduloso-ciliatis præterea minute pubescentibus. Calyx subglaber alte 5-lobatus, lobis ovato-oblongis vel ovato-lanceolatis ad basin latissimis in longitudine inæqualibus apice 2-setoso-lobatis vel laciniatis circ. 4 mm. longis basi  $1\frac{1}{2}$  mm. latis minute ciliolatis vel ciliis obsoletis. Corolla late campanulata basi hypocrateriformis  $5\frac{1}{2}$  cm. longa alte 5-lobata, lobis  $3\frac{1}{2}$  cm. longis ovato-oblongis utraque pagine glabris. Stamina 10, filamentis in longitudine inæqualibus basi glabris supra basin usque ad vix infra medium hirsutis medio sursum glabris, antheris obovato-oblongis  $3\frac{2}{3}$  mm. longis  $1\frac{2}{3}$  mm. latis apice obtusis brevissime lobatis basi obtusis emarginatis. Ovarium cylindraceum 8 mm. longum 2 mm. latum brevissime tenuissimeque pubescens tenuissime 5-sulcatum, stylo glabro 3 cm. longo apice dilatato, stigmate terminali brevissime 5-lobato, lobis brevissimis rugosis.

HAB. Fokien : Mt. Isan, leg. S. NAGASAWA, 1910, Aprili. (Fl.)

Near *R. Westlandii* HEMSL. (Ind. Fl. Sin. II. p. 31); but differs from it by the shortly cuspidate apex of the leaves; from *R. Simiarum* HANCE by the ciliate peduncles.

**Rhododendron formosanum** HEMSL. in Kew Bullt. p. 183 (1895).

HAB. Formosa : loco non indicato, leg. U. MORI, 1912, Aug.

**Rhododendron gnaphalocarpum** HAYATA sp. nov. Rami ultimi glaberrimi rubescentes. Folia ad apicem ramulorum fasciculata oblonga membranacea 3 cm. longa  $1\frac{1}{2}$  cm. lata apice obtuso-acuta brevissime calloso-obtusa basi obtusa vel acuta utrinque pilis brevibus tenuibus obtecta, supra fuscentia subtus pallida, subtus reticulis venularum conspicuis, petiolis brevioribus 3 mm. longis. Peruli alabastri florum multiseriati, intimi longissimi oblongi obtusi 1 cm. longi extus breviter hirsuti intus glabri. Flores terminales quasi-solitarii, pedicellis 1 cm. longis molle pubescentibus. Calyx brevissimus 1 mm. longus non lobatus margine integer dense sericeo-hirsutus. Corolla late campanulata purpurascens 3 cm. longa, lobis 5 patentibus oblongis. Stamina

8, filamentis glabris 2 cm. longis antheris ellipticis 2 mm. longis  $1\frac{1}{2}$  mm. latis apice truncatis 2 porosis basi emarginatis. Ovarium elongato-ovoideum  $3\frac{1}{2}$  mm. longum densissime molle sericeo-tomentosum, pilis albis, stylo 3 cm. longo glaberrimo apice dilatato, stigmatē terminali.

HAB. Fokien: Isan, leg. S. NAGASAWA, 1910, Aprili. (No. 239).

Near *R. Weyrichii* MAXIM.; but differs from it by the pure snow white hairs on the ovary and by the oblong leaves; from *R. dilatatum* by the more densely hairy ovary; and from *R. rhombicum* by the entirely glabrous styles.

**Rhododendron hyperythrum** HAYATA sp. nov. Rami glabri fusco-purpurascens. Folia elliptico-lanceolata usque ad 10 cm. longa  $2\frac{1}{2}$ –3 cm. lata apice acuta vel breve acuminata vel cuspidata ad summum callosa-acuta basi acuta vel obtusa, margine integerrima coriacea supra glabra subtus fulvo-rubescens lepidota, (costis supra impressis subtus prominentibus, venis lateralibus primariis supra leviter impressis, subtus leviter elevatis, utroque latere costæ 10–13 interdum obscuris), margine leviter desuper recurva, petiolis  $1\frac{1}{2}$ – $2\frac{1}{2}$  cm. longis supra angustissime sulcatis. Flores 7–8 quasiterminaliter quasi-fasciculatim dispositi, perulis multi-seriatis inferioribus minutis cuspidiformibus, infimis longissimis obovato-oblongis pedicellum in longitudine superantibus 2– $2\frac{1}{2}$  cm. longis 1 cm. latis extus sericeo-tomentosis intus subglabris vel sursum pubescentibus apice breve acutis, bracteolis filiformibus 1 cm. longis, pedicellis 2 cm. longis brevissime hirsutis. Calyx subplanus 5-dentato-lobatus, lobis triangularibus apice obtusis extus glanduloso-hirsutis intus glabris latissimis  $\frac{1}{2}$  mm. longis. Corolla campanulata 3 cm. longa 4 cm. in diametro 5-lobata, lobis latis rotundatis leviter emarginatis. Stamina 10 in longitudine inæqualia inclusa, filamentis basi pilis brevissimis hirsutis, antheris oblongo-rectangularibus apice truncatis 2 porosis basi breviter 2-lobatis. Ovarium cylindrico-ovoideum 3 mm. latum, pilis brevibus glandulosis dense obtectum 5-sulcatum, stylo  $2\frac{1}{2}$  cm. longo 5-sulcato prope basin pilis glandulosis brevibus instructo apice dilatato-campanulato, stigmatē terminali.

HAB. Formosa: regionibus meridionalibus, leg. N. KONISHI.

Near *R. Mori* HAYATA, differs from it by the leaves which are densely reddish lepidoted on the under side.

**Rhododendron indicum** SWEET var. **eriocarpum** HAYATA n. v. Rami pilis squamiformibus dense obtekti. Folia oblonga vel obovato-oblonga  $2\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  cm. lata membranaceo-chartacea supra pilis adpressis parce obtecta subtus pilis adpressis longiusculis obtecta, subtus ad costas et venas densiuscule pilosa, pilis fulvis, petiolis 5 mm. longis dense pilosis. Flores 2-3-4 fasciculati terminales, pedicellis 1 cm. longis dense pilosis. Calycis lobi rotundato-oblongi  $1\frac{1}{2}$  mm. longi  $1\frac{1}{3}$  mm. lati apice rotundati margine longe ciliati, (ciliis 2 mm. longis) extus pilosi. Corolla campanulata  $3\frac{1}{2}$  cm. lata 5-lobata, lobis oblongis apice rotundatis. Stamina 9-10 inaequalia, filamentis deorsum hirsutis, antheris oblongo-ellipticis  $2\frac{1}{2}$  mm. longis 1 mm. latis apice lobatis truncatis 2-porosis basi obtusis. Ovarium cylindrico-conicum  $3\frac{1}{2}$  mm. longum, pilis 2 mm. longis dense obtectum, stylo glabro 3 mm. longo apice  $\pm$  dilatato, stigmatе terminali brevissime 5-lobato.

HAB. Liukiu: Nakanoshima, (No. 96), Aug. 1910.

Differs from the type by the obovate or shortly oblong leaves.

**Rhododendron indicum** SWEET var. **formosanum** HAYATA n. v. Rami pilis squamiformibus dense obtekti. Folia oblonga ovata rotundato-ovata chartacea  $2\frac{1}{2}$  cm. longa 2 cm. lata supra molle tenuiter parce adpresse hirsuta, subtus pilis longiusculis adpressis parce obtecta, apice obtusa ad summum obtuse apiculata basi acuta, (venis primariis lateralibus utroque latere costae 3-4 arcuato-flexuosis cum venis proximis superioribus areolam formantibus), subtus ad costas dense pilosa. Flores 3-4 ad apicem ramulorum fasciculatim quasi-terminales, pedicellis 1 cm. longis dense pilosis. Calyx 5-lobatus, lobis elongatis oblongis obtusis 3 mm. longis  $1\frac{1}{3}$  mm. latis margine longe ciliatis intus glabris extus dense pilosis. Corolla late campanulata 3 cm. longa 5-lobata, lobis oblongis apice rotundatis, tubo deorsum breve hirsuto. Stamina 10, inaequalia, filamentis deorsum hirsutis, antheris oblongo-linearibus 2 mm. longis  $\frac{3}{4}$  mm. latis apice truncatis 2-porosis basi emarginatis. Ovarium 2 mm. longum, stylo glabro 3 cm. longo apice leviter dilato, stigmatе terminali.

HAB. Kuskusu, leg. C. ŌWATARI, Mart. 1898.



**Rhododendron** (*Choniastrum*) **lamprophyllum** HAYATA sp. nov. Rami glabri vel tenuissime pubescentes. Folia versus apicem ramorum congesta glaberrima supra nitida chartacea vel chartaceo-membranacea oblongo-lanceolata  $6\frac{1}{2}$  cm. longa 2 cm. lata apice cuneato-acuta ad summum obtusa ad centrum summorum mucronibus circ. 1 mm. longis obtusis instructa, basi acuta vel obtuso-acuta, (supra costis et venis lateralibus tenuiter elevatis costis supra brevissime pubescentibus, subtus costis prominente elevatis venis tenuissimis venulis reticulatis, supra impresso-reticulatis vel non vassis), petiolis  $1\frac{1}{2}$ –2 cm. longis supra angustissime canaliculatis tenuissime pubescentibus vel glabris. Flores ad axillas foliorum superiorum solitarii, bracteis vel perulis basi pedicellorum sitis, perulis extimis brevissimis late ovatis  $1\frac{1}{2}$  mm. longis 2 mm. latis, intimis longissimis 9 mm. longis late ovatis 7 mm. latis margine ciliolatis utraque pagina glabris ad insertionem 2 mm. latis, bracteolis spathulato-linearibus 3 mm. longis  $\frac{1}{2}$  mm. latis ciliolatis. Pedicelli 1– $1\frac{1}{2}$  cm. longi glanduloso-hirsuti. Calyx fructifer campanulatus glanduloso-hirsutus alte 5-lobatus, lobis rectangulari-oblongis vel linearibus 7–8 mm. longis  $3\frac{1}{2}$  mm. latis basi extus deorsum glanduloso-hirsutis medio sursum glabris intus toto glabris margine approximativim ciliolatis, (ciliolis crassis) apice obtusis. Capsula ovoideo-ellipsoidea 8 mm. longa  $5\frac{1}{2}$  mm. lata pilis glandulosis validiusculis obtecta. Semina minuta angulato-columnaria obliqua, (angulis prominentibus), utrinque obtusa 1 mm. longa  $\frac{1}{4}$  mm. lata nigricantia longitudinaliter minute sub microscopio striato-reticulata utrinque rubescentia.

HAB. Randaizan, leg. B. HAYATA et U. MORI, 1908, Aug. Fr.

**Rhododendron lasiostylum** HAYATA sp. nov. Rami et ramuli pilis fulvescentibus squamiformibus dense obtekti, pilis  $1\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis. Folia chartacea oblonga vel oblongo-lanceolata 33 mm. longa 12 mm. lata apice acuta ad summum apiculata basi acuta supra scabro-pilosa, (pilis brevibus adpressis basi tumidis) subtus adpresso-pilosa ad costas prominentes dense adpresseque pilosa (pilis squamiformibus lanceolatis 2 mm. longis), venulis minute reticulatis, petiolis 8 mm. longis pilis dense adpressis obtektis. Flores ad apicem ramulorum terminales 2–3-aggregati, pedicellis 5 mm. longis pilis squamiformibus albicantibus dense obtekti. Calyx 5-lobatus, lobis elongato-

oblongo-ovatis 3 mm. longis 1 mm. latis margine longe denseque ciliatis intus glabris extus pilosissimis. Corolla campanulata  $1\frac{1}{2}$  mm. longa 5-lobata, lobis inaequalibus circ. 1 cm. longis oblongis apice obtuso-rotundatis. Stamina 10, longitudine inaequalia circ.  $1\frac{1}{2}$  cm. longa, filamentis complanatis a basi usque ad supra medium brevissime hirsutis, antheris oblongis  $1\frac{1}{2}$  mm. longis apice truncato-emarginatis basi obtusis obscure apiculatis. Ovarium ovoideo-conicum 2 mm. longum pilis albicantibus dense obtectum, stylo declinato filiformi 14 mm. longo a basi usque ad medium piloso sursum glabro, stigmate  $\pm$  dilatato. Capsula lignosa cylindrica 8 mm. longa, valvis 8 mm. longis  $1\frac{1}{2}$  mm. latis dorso strigilloso-pilosis.

HAB. Monte Randaisan, leg. U. MORI, Juni., 1911.

**Rhododendron** (*Choniistrum*) **leiopodum** HAYATA sp. nov. (Tab. XXIV.) Ramuli graciliusculi recti ternatim ramosi cinerascetes. Folia versus apicem ramulorum approximativim disposita coriacea elliptico-lanceolata vel oblanceolata usque ad 10 cm. longa  $2\frac{1}{2}$  cm. lata sursum medio latissima apice breve acuminata basi cuneata vel cuneato-acuta margine revoluta supra in exsiccatu viridia subtus pallidiora, supra costis et venis impressis, venis venulis impresso-reticulatis, subtus costis prominentibus venis lateralibus tenuissime elevatis vix conspicuis, utrinque glabra, petiolis  $1\frac{1}{2}$  cm. longis supra angustissime sulcatis apice angustissime alatis facie fuscentibus. Flores circa gemmam terminalem ad axillas foliorum quasi-verticillatorum summorum verticillatim siti, ad axillam folii singuli solitarii, floribus singulis perulis multis involueratis, perulis multis, extimis minimis late ovatis 3 mm. longis, interioribus majoribus, intimis longissimis spathulatis 3 cm. longis pedicellum 2-plo superantibus apice obtusis obtuso-rotundatis margine dense ciliolatis supra medio usque ad basin abrupte angustatis, partibus angustatis 18 mm. longis 3 mm. latis extus tenuiter pubescentibus intus glabris, bracteolis spathulatis angustissime linearibus 3 cm. longis sursum 3 mm. latis basi 1 mm. latis margine dense ciliatis extus tenuiter pubescentibus intus glabris, pedicellis 2 cm. longis vel brevioribus glabris. Calyx minor brevissimus 4 mm. in diametro 5-dentatus, dentibus late triangularibus obtusis 2 mm. latis  $\frac{1}{2}$  mm. longis glaberrimis. Corolla campanulato-hypocrateriformis usque

ad 6 cm. longa, tubo  $2\frac{1}{2}$  cm. longo deorsum angustato intus supra basin usque ad infra medium tenuiter hirsuto, limbo 5-lobato, lobo superiore  $3\frac{1}{2}$  cm. longo  $2\frac{1}{2}$  cm. lato oblongo apice rotundato prope basin purpureo-punctato, lobis altris vix minoribus. Stamina 8, in longitudine inæqualia, filamentis complanatis prope basin tenuiter hirsutis basin glabris, a infra medium usque ad apicem glabris, antheris ellipsoideis 3 mm. longis  $1\frac{1}{2}$  mm. latis apice truncatis lobatis 2-porosis basi emarginatis. Ovarium cylindricum 1 cm. longum  $2\frac{1}{2}$  mm. latum glabrum leviter 5-sulcatum, stylo glabro 5 cm. longo apice vix dilatato, stigmate brevissime 5-lobato.

HAB. Shichiseitonsan, leg. S. SASAKI, 1911, Aprili. Fl.

The present plant is more or less related to *R. Henryi*, *R. Simiarum* and *R. ellipticum*, but differs from the first by the glabrous leaves, from the second by the glabrous peduncles and shortly acuminate glabrous leaves, and from the last in the pallid under surface of the leaves.

**Rhododendron** (*Choniastrum*) **leptosanthum** HAYATA sp. nov. *Rhododendron ellipticum* HAYATA Fl. Mont. Formos. p. 152, pro parte, (non MAXIM). Rami  $\pm$  flexuosi cinerascetes. Folia versus apicem rami disposita ovato-vel obovato-oblonga 5-6 cm. longa 2- $2\frac{1}{2}$  cm. lata utroque acuta apice acutissima basi acuta, (costa supra impressa subtus prominenti venis utraque facie tenuiter elevatis vix conspicuis) supra nitida subtus opaca pallidiora margine integerrima tenuissime recurva vel plana utraque glabra, petiolis brevioribus in longitudine  $\frac{1}{4}$ -plo laminam æquantibus glabris supra angustissime sulcatis apice angustissime alatis. Flores quasi-terminaliter 5-6-fasciculati, (in sensu stricto circa gemmam ad axillas foliorum summorum quasiverticillatorum verticillatim 5-6 siti), perulis deciduis non visis, pedicellis glabris  $1\frac{1}{2}$  cm. longis. Calyx brevissimus  $2\frac{1}{2}$  mm. in diametro brevissime 5-dentatus, dentibus glabris brevissimis  $\frac{1}{3}$  mm. longis obtusissimis. Corolla late campanulata 3 cm. longa, tubo brevi 1 cm. longo, limbo 5-lobato, lobis patentibus 2 cm. longis obovato-oblongis apice rotundatis intus supra basin usque ad infra medium tenuiter hirsutis. Stamina 10 in longitudine inæqualia, filamentis supra basin usque ad infra medium hirsutis basin glabris, infra medium usque ad apicem glabris, antheris ovato-oblongis 2 mm. longis apice truncatis basi

emarginatis non apiculatis. Ovarium cylindricum 5 mm. longum  $1\frac{1}{3}$  mm. latum glabrum tenuiter 5-sulcatum, stylo  $2\frac{1}{2}$  cm. longo glaberrimo apice vix dilato, stigmatibus brevissime 5-lobatis.

HAB. In montibus prope Akō, ad 5000 ped. alt., leg. T. KAWAKAMI, 1907.

Differs from *R. leiopodum* by the much smaller flowers and ovato-oblong leaves; and from *R. ellipticum* in its pale lower surface of the leaves.

**Rhododendron longiperulatum** HAYATA sp. nov. Rami et ramuli ternatim ramosi divaricati pilis squamiformibus adpressis atro-castaneis dense obtekti. Folia chartacea oblonga 23 mm. longa 11 mm. lata in exsiccato flavescentia apice acuta ad summum apiculata supra scabro-pilosa (pilis albicantibus basi tumidis patentibus) infra parvissime pilosa, ad costas dense ad venulas parce adpresso-pilosa (pilis castaneis adpressis), supra costis venis et venulis impressis, venulis impresso-reticulatis, subtus costis et venis leviter elevatis venulis impressis reticulatis, venis primariis lateralibus utroque latere costæ 3-4 leviter arcuatis, petiolis brevissimis 2 mm. longis semiteretibus, pilis linearibus 3-4 mm. longis obtektis. Folia sub fasciculo florum variabilia spatulata basi dilata gradatim ad perulam abeuntia. Flores terminales 2-3-fasciculati, fasciculo in alabastro perulis imbricatis suffulto, perulis extimis minoribus ovatis brevioribus acutis, interioribus longioribus, intimis (vel bracteis sub flore) longissimis angustato-oblongis 18 mm. longis 5 mm. longis apice acutis, omnibus intus glabris extus dorso sursum ferrugineo-pilosis deorsum glabris. Flores 1-bracteati et 2-bracteolati, bracteis linearibus 11 mm. longis  $\frac{1}{10}$  vel  $\frac{1}{20}$  mm. latis intus glabris extus pilosissimis, pedicellis 4-5 mm. longis longe pilosissimis. Calyx 5-lobatus, lobis triangulari-ovatis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis intus glabris extus longe denseque pilosis, pilis 3 mm. longis. Corolla campanulata 3 cm. longa 5-lobata, lobis oblongis 1 cm. longis apice rotundatis basi leviter contractis. Stamina 10 in longitudine inæqualia, filamentis complanatis deorsum hirsutis sursum glabris, antheris elongato-oblongis  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice truncatis 2-porosis basi leviter emarginatis non apiculatis, loculis anterioribus brevioribus quam his posterioribus. Ovarium cylindrico-ovoideum  $1\frac{1}{2}$  mm. longum pilis longissimis  $2\frac{1}{2}$  mm. longis dense obtektum, stylo glaberrimo cum

ovario articulado 3 cm. longo, stigmate terminali  $\pm$  dilatato. Capsula breve cylindrica 7 mm. longa extus hirsuta.

HAB. Mt. Daiton, leg. Y. SHIMADA, Aug. 1910.

**Rhododendron Morii** HAYATA Mater. Fl. Formos. p. 173. Descriptio auctata: Folia in exsiccatu supra venis et venulis elevato-reticulatis, areolis intra reticulum impressis. Fores 5-6, terminale ad apicem ramorum fasciculati, pedicellis 2 cm. longis brevissime glanduloso-hirsutis. Calyx subplanus brevissimus 5 mm. in diametro breve 5-lobatus, lobis brevissimis late rotundatis margine glanduloso-ciliolatis (ciliolis brevissimis obtusis) utraque glabris. Corolla late campanulata a basi usque ad apicem gradatim ampliata  $4\frac{1}{2}$  cm. longa 5 cm. in diametro 5-lobata, lobis 2 cm. longis late rotundatis apice rotundatis vel tenuiter emarginatis, tubo intus latere superiore punctato-maculato, areolis punctatis obovatis 3 cm. longis  $2\frac{1}{2}$  cm. latis. Stamina 10, filamentis in longitudine inæqualibus basi  $\pm$  dilatis, partibus dilatis 8 mm. longis 1 mm. latis brevissime denseque hirsutis (pilis ferrugineis), partibus non dilatatis glabris, antheris ellipsoideis  $3\frac{1}{2}$  mm. longis apice truncatis basi lobato-emarginatis. Ovarium cylindricum 8 mm. longum  $3\frac{1}{2}$  mm. latum, pilis glandulosis brevissimis dense obtectum tenuiter 5-sulcatum, stylo  $3\frac{1}{2}$  cm. longo prope basin glanduloso-hirsuto cæterum glaberrimo apice dilatato, stigmate terminali.

HAB. Randaisan, 1908, leg. U. MORI, (No. 3514).

**Rhododendron** (*Azaleastrum*) **ovatum** PLANCH. ex MAXIM. Rhod. As. Or. p. 45; FORBES et HEMSLE. Ind. Fl. Sin. II. p. 28.

*Azalea ovata* LINDE; HOOK. Bot. Mag. t. 5064; BENTH. Fl. Hongk. p. 201.

OBSERV. Rami cinerascens subglabri vel brevissime pubescentes, cicatricibus foliorum obtriangulari-rotundatis. Folia chartacea vel tenuiter coriacea versus apicem ramorum approximativè disposita ovata vel ovato-oblonga  $4\frac{1}{2}$  cm. longa 2 cm. lata apice cuneato-acuta ad summum obtusa ad centrum summorum mucronibus brevissimis instructa, basi rotundata vel obtusa utraque opaca et glabra subtus pallidiora, supra ad costas brevissime pubescentia, costis et venis supra elevatis elevato-reticulatis, subtus costis elevatis venis

non elevatis planis, venis lateralibus primariis inconspicuis, petiolis 7 mm. longis angustissime alatis supra angustissime sulcatis dense brevissimeque pubescentibus. Flores ad axillas foliorum superiorum solitarii perulis multiseriatis instructi, perulis extimis minutis triangularibus, intimis longissimis obovatis 1 cm. longis 8 mm. latis apice obtusis vel rotundatis basi deorsum angustatis ad insertionem  $1\frac{1}{2}$  mm. latis margine revolutis minute ciliolatis (ciliolis minutissimis brevissimis obtusis) intus glabris extus brevissime pubescentibus, bracteolis filiformibus minimis 1 mm. longis, pedicellis  $1\frac{1}{2}$  mm. longis brevissime pubescentibus pilis glandulosis parce hac atque illac dispersis. Calyx late campanulatus alte 5-lobatus extus basi pilis setulosis dense obtectus, lobis ovatis 5 mm. longis 4 mm. latis apice rotundatis membranaceis margine ciliolatis (ciliolis obtusis brevissimis  $\pm$  glandulosis) extus basi pilis setulosis dispersis, cæterum brevissime pubescentibus vel glabris, intus glaberrimis. Corolla late campanulata  $2\frac{1}{2}$  cm. longa 4 cm. in diametro alte 5-lobata, (lobis rotundatis 2 cm. longis), prope basin lobi superioris purpureo-punctato-maculata, tubo intus brevissime pubescenti. Stamina 5 in longitudine inæqualia, filamentis medio deorsum hirsutis sursum glabris complanatis, antheris oblongis 3 mm. longis  $1\frac{1}{2}$  mm. latis apice truncatis 2-porosis lobatis basi obtusis interdum obscure apice latis. Ovarium latissime conicum  $3\frac{1}{2}$  mm. latum 2 mm. longum basi annulariter glabrum (partibus glabris melleo exsudentibus) supra basin usque ad apicem setulis obtusis brevibus dense obtectum, stylo  $2\frac{1}{2}$  cm. longo deorsum tenuissime pubescenti vel subglabro, medio sursum glaberrimo apice haud dilatato, stigmate terminali.

HAB. Fokien: Isan, leg. S. NAGASAWA, 1910, Aprili. (No. 220).

The type I have never seen; description given in BENTH. Fl. Hongk. p. 201, exactly accords with our plant.

**Rhododendron** (*Eurhododendron*) **pachysanthum** HAYATA. Rami et ramuli validi primum tomentosi demum glabrati, cicatricibus foliorum late triangularibus. Folia ad apicem ramorum approximativè sita elongato-oblonga 8-9 cm. longa  $3\frac{1}{2}$  cm. lata ad medium latissima apice acutissima basi rotundata vel obtusa obtuso-rotundata supra glabra basi albo-ferrugineo-tomentosa, (pilis stellatis dense obtectis) demum glabra coriacea, supra costis

angustissime sulcatis subtus prominentibus, venis utraque pagine vix conspicuis, supra sub microscopio minute reticulata, areolis intra reticulum elevatis, venis lateralibus primariis tenuissimis supra tenuiter impressis rectis subtus tenuissime elevatis, petiolis  $1\frac{1}{2}$  cm. longis supra sulcatis tomentosis. Gemma foliorum ovoideo-cylindrica 3 cm. longa 7 mm. lata, perulis inferioribus cuspidiformibus, superioribus elongatis acutis. Flores ad apicem ramorum 10–20-fasciculati (sed in sensu stricto in racemis brevissimis, rhachidibus 1–2 cm. longis multo brevioribus quam pedicellis) perulis multis involuclati, perulis extimis minutis late triangularibus longe cuspidatis 3 mm. latis, medioeribus majoribus rotundatis 2 cm. longis apice obtusis valde concavis, intimis (vel bracteis) spathulatis 3 cm. longis sursum 1 cm. latis deorsum angustatis attenuatis basi 2 mm. latis sursum latissimis alabastrum florum amplectantibus apice emarginatis ad centrum breve cuspidatis extus dense intus laxo sericeo-hirsutis, bracteolis filiformi-linearibus 1 cm. longis pubescentibus, pedicellis  $2\frac{1}{2}$  cm. longis glanduloso-pubescentibus. Calyx brevissimus late 5-dentato-lobatus, lobis late triangularibus acutis margine glanduloso-ciliolatis (ciliolis brevissimis obtusis) extus basin glanduloso-hirsutis. Corolla late campanulata 4 cm. longa totiusque in diametro, tubo late campanulato 2 cm. longo latere dense maculato-punctato, (parte superiore tubi punctata obovata  $1\frac{1}{2}$  cm. longa 8 mm. lata), limbo 5-lobato, lobis tubum in longitudine æquantibus rotundatis apice  $\pm$  emarginatis utrinque glabris. Stamina 10, filamentis in longitudine inæqualibus basi dilatatis, partibus dilatatis 4 mm. longis hirsutis cæterum glabris, antheris ellipsoideis apice truncatis basi obtusis emarginatis non apiculatis. Ovarium cylindricum 5 mm. longum 2 mm. latum pilis brevissimis glandulosis dense obtectum, stylo toto glabro  $2\frac{1}{2}$  cm. longo apice vix dilatato, stigmate terminali brevissime 5–6-lobato. Capsula dense pilis brevissimis obtecta cylindrica  $1\frac{1}{2}$  cm. longa  $\frac{1}{2}$  cm. lata.

HAB. In montibus centralibus, leg. U. MORI, 1911, Aprili. Fl.

Near *R. Morii* HAYATA; but differs from it by the quite glabrous style, and in its leaves which are densely tomentose beneath, and are so impressingly reticulated on the upper surface that intra-reticular areoles are elevated.

**Rhododendron** (*Eurhododendron*) **rubropunctatum** HAYATA sp. nov.

Frutex; rami validissimi, cortice cinerascenti subglabro. Folia versus apicem ramorum approximativim disposita coriacea usque ad 11 cm. longa  $3\frac{1}{2}$  cm. lata elongato-oblonga vel oblanceolata a medio sursum latissima apice obtuso-acuta ad summum breve crasso-apiculata basi obtusa utrinque glabra supra in exsiccatum opaca subtus flavo-pallida, sub microscopio minute rubropunctata margine integra desuper recurva, (supra costis impressis, venis primariis tenuissimis impressis vix conspicuis, subtus costis prominentibus, venis primariis lateralibus tenuissime elevatis) utraque glabra, petiolis usque ad 3 cm. longis rugosis subglabris fuscentibus apice latere brevissime subulatis supra angustissime sulcatis. Gemma foliorum ovato-cylindrica 4 cm. longa 8 mm. lata multiserialiter perulata, perulis extimis brevissimis cuspidatis, intimis longissimis oblongis 4 cm. longis. Flores breve racemosi vel fasciculati, racemis terminalibus, rhachidibus 2 cm. longis, longe pedicellatis, pedicellis 4 cm. longis caducissime pubescentibus, perulis multiserialiter extimis minutis late rotundatis glabris, intimis longissimis angustatis 4 cm. longis 8 mm. latis obtusis utraque facie molle denseque sericeo-pubescentibus, bracteis filiformibus hirsutis 1 cm. longis. Corolla late campanulata circ. 5 cm. longa 5-lobata, lobis oblongo-rotundatis 2 cm. longis apice rotundatis vel emarginatis, tubo utraque glabro medio latere superiore purpureo-punctato. Stamina 10, in longitudine inaequalia, filamentis basi  $\pm$  dilatatis, partibus dilatatis 6 mm. longis brevissime denseque hirsutis, cæterum glabris, antheris oblongo-cuneiformibus 4 mm. longis 1 mm. latis apice truncatis 2-porosis lobatis basi angustatis lobatis vel emarginatis haud apiculatis. Ovarium ovoideo-conicum 6 mm. longum  $4\frac{1}{2}$  mm. latum 5-sulcatum dense hirsutum, stylo 4 cm. longo vix exserto a medio deorsum hirsuto sursum glabro apice dilatato, stigmate terminali brevissime lobulato.

HAB. Mt. Shichiseitonzan, leg. S. SASAKI, Aprili. 1910.

### *Pyrola* LINN.

***Pyrola alboreticulata*** HAYATA sp. nov. (Tab. XXV.) Suffrutex humilis, caules ascendentes cum racemis 15-20 cm. longi, basi foliosi, partibus foliosis 7-5 cm. longis, inter folios squamatis, squamis linearibus acutis circ. 1 cm. longis, a supra basi sursum aphylli supra medium bracteis 1



vel 2 instructi, versus apicem flores 2-3 gerentes. Folia alterna approximata vel remota glabra tenuiter coriacea ovata vel oblonga 3-4 cm. longa  $1\frac{2}{3}$ -3 cm. lata apice acuta ad summum minute calloso-mucronata basi rotundata subito ad extremitatem acuta ad petiolum attenuata, æqualia interdum obliqua, margine integra sed remote mucronibus minutis instructa (mucronibus a se circ. 5 mm. remotis) tenuiter marginata vel leviter angustissime recurvata supra in vivo fusco-viridia, ad nervos et venas albo-reticulata, subtus pallidissima, nervis venisque utraque pagine tenuissime elevatis, venis primariis lateralibus utroque latere costæ 4-3 angulo  $80^\circ$  a costâ divaricatis sursum arcuatis eas superiorem proximam attingentibus areolas utroque latere costæ 3-4 formantibus, petiolis 3-4 cm. longis laminam in longitudine 2-plo superantibus vel paullo longioribus complanatis supra sulcatis. Racemi 3-4-florati, floribus 1 cm. a se remotis, pedunculis (vel partibus caulis aphyllis) circ. 10 cm. longis 1 mm. in diametro sectionis subangulatis ad angulis subalatis glabris medio 1-bracteatis. Flores declinati apertientes 15-18 mm. in diametro breve pedicellati, pedicellis 4 mm. longis, sub pedicellis singulis 1-bracteati, bracteis linearibus acutis. Sepala 5 (vel lobi calycis) basi  $\pm$  connata oblongo-angustata 5-6 mm. longa  $2\frac{1}{2}$  mm. lata apice obtusa sursum obscure denticulata vel integra deorsum integra obscure 3-5 nervia basi latissima. Petala 5 obovato-rotundata  $7\frac{1}{2}$ -7 mm. longa 6 mm. lata versus marginem tenuissima 3-4-nervia apice rotundata basi ad insertionem 2 mm. lata margine integra. Stamina 10, per paria petalis opposita, filamentis complanatis 6-7 mm. longis basi circ.  $\frac{3}{4}$  mm. latis introrse  $\pm$  recurvatis 1-costatis, antheris retroflexis oblongis apice (ut videntur) dorso cum filamentis affixis apice extrorse leviter recurvis 2-lobatis, loculis apice in tubum  $\frac{1}{2}$  mm. longum productis introrse 1-porosis apice truncatis basi apiculatis latere profunde 1-sulcatis. Ovarium depresso-globosum  $3\frac{1}{2}$  mm. in diametro æquans apice impressum, stylo declinato columnari 8-9 mm. longo apice  $\pm$  dilatato, stigmate 5 lobato, lobis teretibus. Capsula depresso-globosa apice profunde impressa in sectione verticali obcordata 7-8 mm. in diametro 5 mm. longa 5-lobata loculicide dehiscens. Semina numerosa utroque producta, cum alis linearibus 1 mm. longa  $\frac{1}{10}$  mm. lata utrinque truncata.

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan. 1912; ad summum Bataiankei, leg. MORI, Juni. 1912.

Near *P. rotundifolia* LINN.; but distinguishable from it by the ovate acute leaves with much fewer lateral veins along which the leaves are white reticulated. There is a species called *P. atropurpurea* FRANCHET (Journal de Botanique IX. p. 372) which I could not examine. It may presumably be different from our plant.

**Pyrola morrisonensis** HAYATA (Tab. XXVI.) Fl. Mont. Formos. p. 155; *Pyrola elliptica* NUTT. var. *morrisonensis* HAYATA in Tokyo Bot. Mag. XX. p. 18. Suffrutex humilis 20–30 cm. alta, caulibus repentibus ascendentibus glabris rubro-fuscentibus tereto-angularibus eramosis basi foliosis apice scapiformibus, partibus foliosis inferioribus 3–4 cm. longis. Folia basi caulis sita alterna vel subopposita vel subradicalia longe petiolata ovato-rotundata vel ovato-rhomboidea apice rotundata obtusa acuta vel emarginata basi rotundata vel late truncata ad apicem petiolorum subito breve acuta 2–3 cm. longa 2–2½ cm. lata margine crenulato-serrulata ad sinus serrularum minute calloso-mucronata glabra chartacea, (costis utrinque tenuiter elevatis, venis et venulis supra distincte impressis reticulatis, subtus tenuiter elevatis reticulatis), petiolis longis gracilibus laminam in longitudine triplo superantibus 5–6 cm. longis complanatis supra ± sulcatis basi leviter dilatis glabris. Racemi (vel caules floriferi) 10–25 cm. longi basi foliati supra partem foliosam squamati (squamis alteris inferioribus oppositis superioribus remotis glabris angustatis vel obovato-angustatis 8–10 mm. longis 5 mm. latis 1–nerviis subhyalinis, venis lateralibus tenuissimis apice acutis subobliquis basi æquilateralibus rachidem subamplectantibus) supra medium sursum usque ad partem floriferam nudi, partibus florigeris 8–5 cm. longis, floribus remotis 1–2 cm. a se remotis sub singulis 1-bracteatis, bracteis oblongo-angustatis 8 mm. longis 3 mm. latis basi æquilateralibus apice acutis, pedicellis 7–8 mm. longis recurvato-descendentibus vel patentibus glabris apice vix dilatatis ad calycem abeuntibus. Flores ± cernui apertientes 1½ cm. in diametro. Sepala 5 basi leviter connata ovata apice obtusa vel acuta basi latissima 2½ mm. longa 2 mm. lata apice obscure serrata sursum deorsum integra

1-costata vel 1-nervia, utroque latere nervi 1-venulis parallelis tenuissimis instructa. Petala 5 patentia concava rotundato-oblonga apice rotundata basi obtusa 7-6 mm. longa 5-6 mm. lata basi ad insertionem 2 mm. lata glabra margine obscure denticulata 3-nervia vel obscure 5-nervia, nervis subrectis, venis lateralibus utroque latere patentibus tenuibus paullo-ramosis. Stamina 10, per paria cum petalis opposita, filamentis basi recurvis 7-6 mm. longis complanatis  $\frac{1}{3}$ - $\frac{1}{2}$  mm. latis 1-costatis apice brevissime subfurcatis glabris supra basin dilatis circ.  $\frac{2}{3}$  mm. latis, antheris introrse retroflexis quasi-pendulis apice (ut videntur) dorso cum filamentis affixis angustato-ellipsoideis  $2\frac{3}{4}$  mm. longis 1 mm. latis apice 2-lobatis basi brevissime 2-apiculatis, loculis 2 latere profunde 1-sulcatis apice gradatim in tubum  $\frac{1}{3}$  mm. longum productis apice introrse 1-porosis basi apiculatis. Ovarium glabrum depresso-globosum 3 mm. in diametro 2 mm. longum 5-lobatum apice depressum (obcordatum in sectione verticali) 5-loculare, loculis multi-ovulatis, stylo declinato versus apicem ascendenti columnari 8-9 mm. longo apice  $\pm$  clavato-dilatato vel campanulato-dilato apice  $1\frac{1}{2}$  mm. in diametro, stigmatibus in partem campanulatam apicis styli leviter exserto 5-lobato lobis, teretibus. Capsula depresso-globosa 5 mm. in diametro 3 mm. longa 5-lobata loculicide dehiscens apice profunde impressa (in sectione verticali profunde obcordata), placentis spongiosis axe persistenti affixis, polysperma. Semina minuta, testa utrinque producta truncata reticulata cellulari; albumine carnoso.

HAB. Ad summum Bataiankei, leg. U. MORI, Juni. 1912.

As original description is based on an imperfect specimen which lacks flowers, I have taken this occasion to give the full description of this species basing it upon a perfect specimen.

### *Chimaphila* PURSH.

***Chimaphila japonica*** MIQ.; MATSUM. Ind. Pl. Jap. II.-2 p. 448.

HAB. In Monte centrali, ad 10000 ped. alt., leg. U. MORI, Dec. 1908.

No flowers; as far as is concerned fruits and general appearance, it is referable to this Japanese species.

## Monotropeæ.

*Monotropa* LINN.

**Monotropa uniflora** LINN.; FORBES et HEMSL. Ind. Fl. Sin. II. p. 34.

HAB. Arisan, leg. S. SASAKI, Mart. 1911.

DISTRIB. Northern India, Central China, Mandshuria, Japan and North America.

## Diapensiaceæ.

*Shortia* TORR. et GR.

**Shortia** (Sect. *Exappendiculata*) **exappendiculata** HAYATA n. sp. (Tab. XXVII.) Rhizoma ascendens vel repens lignosum teres 4 mm. in diametro sectionis, radices fibrosas longissimas emittens, apice approximativum foliosum, ad apicem scapos solitarios vel 2-3 cæspitosos gerens. Folia omnia radicalia 10-20 patentissima ad terram attingentia longe petiolata fere rotundata maxima 5 cm. in diametro apice late truncata basi rotundata ad extremitatem subito acuto-attenuata ad petiolum abeuntia chartacea margine serrato-crenata, (crenis obtusis sed ad apicem minute mucronatis), utraque pagina glabra, (supra costis venis et venulis distincte elevatis, venis lateralibus primariis utroque latere costæ 3, ramis venarum primariarum ad mucrones crenarum attingentibus, subtus costis prominente sed venis primariis et venulis obscure elevatis, vel non elevatis), petiolis usque ad 7 cm. longis sursum complanatis (dorso compressis) subalatis sed a medio deorsum a latere compressis facie angustissime sulcatis. Scapi ad apicem rhizomatum solitarii vel 2-3-fasciculati erecti 5 cm. longi (fructiferi 15 cm. longi vel longiores) glabri teretes prope apicem 2-4-bracteati, basi perulis 6-7 involuerati, perulis interdum linearibus vel ovatis obtusis vel acutis circ. 7 mm. longis crassiusculis, bracteis versus apicem vel infra florem 3-4 longe triangularibus vel late cuspidatis  $4\frac{1}{2}$  mm. longis  $3\frac{1}{2}$  mm. latis. Sepala 5 ovata 6 mm. longa

4 mm. lata apice acuta basi leviter contracta 2 mm. lata valde imbricata 7-nervia glabra. Corolla late campanulata 8 mm. longa leviter 5-loba, lobis brevibus 3 mm. longis 5 mm. latis rectangularibus apice late truncatis vel rotundatis altiuscule crenulatis, venis lateralibus utroque latere 3, utraque facie glabra. Stamina 5, lobis corollæ alterna, antheris sessilibus ad medium inter sinus et basin corollæ sitis cordato-reniformibus apice emarginatis basi cordatis 1 mm. longis  $1\frac{1}{2}$  mm. latis. Staminodia 0. Ovarium globosum glabrum 2 mm. in diametro, stylo 4 mm. longo simplici, stigmatе terminali non lobato. Calyx fructifer  $\pm$  accrescens, sepalis late ovato-triangularibus 5 mm. longis basi latissimis 3-4 mm. latis. Capsula ovoidea 5 mm. longa, sepalis inclusa, loculicide dehiscens, valvis a columna solutis, columna centrali crassa. Semina angulato-fusiformia  $\pm$  obliqua 1 mm. longa atro-rubra minute reticulata.

HAB. Rakuraku, leg. G. NAKAHARA, Aug. 1905; Mt. Musha, ad 7000 ped. alt., leg. U. MORI (No. 1153); Randaisan, leg. U. MORI, Aug. 1908.

Differs from all the known species of the genus by the sessile anthers, not divided styles of the capsules, and by the absence of the staminodes. It may constitute a new genus *Shortiopsis* (I should propose to call it) on account of the characters just mentioned.

**Shortia subcordata** HAYATA sp. nov. Ut plantæ præcedentis, sed folia rotundata, 4 cm. in diametro, margine crenata, ad summum crenarum mucronata, basi rotundata vel cordata. Flores minores.

HAB. Shintiku: Kareizan, leg. U. MORI, 1906, Juni., (No. 1422.)

Differs from the preceding plant by the round- or cordate-based leaves.

**Shortia transalpina** HAYATA sp. nov. Rhizomata erecto-ascendentia basi radices tenues fibrosas emittentia, apice 2-3 ramosa, ramis simplicibus folios et scapum gerentibus. Folia omnia radicalia 5-6 ad apicem rhizomatum sita rotundato-spathulata vel rotundato-ovata longe petiolata; laminæ obovato-spatulatæ vel obovatæ 2 cm. longæ  $1\frac{1}{2}$  cm. latæ apice perfecte rotundatæ basi subito attenuatæ gradatim ad petiolum abeuntes utraque glabræ, costis et venis utraque pagine vix conspicuis vel tenuissime elevatis,

venis lateralibus primariis utroque latere 2-3, margine subintegræ sursum utroque latere crenis 3 instructæ (crenis brevissimis vel obscuris) ad sinus inter crenas mucronibus instructæ, petiolis  $2\frac{1}{2}$  mm. longis sursum angustissime alatis supra sulcatis basi  $\pm$  dilatatis. Flores ignoti. Scapi fructiferi ad apicem ramorum rhizomatum solitarii vel 2-3-fusculati erecti 7 cm. longi aphylli uniflorati versus apicem 3-4-bracteati basi perulis 2 instructi, perulis lineari-ovatis 6 mm. longis apice obtusis, bracteis ovatis vel triangulari-cuspidatis 4 mm. longis. Sepala fructifera  $\pm$  accrescentia exteriora ovata 6 mm. longa apice obtusa interiora angustiora 6-7 mm. longa 2 mm. lata circ. 10-nervia apice obtusa. Capsula ovoidea 3 mm. longa, stylo simplici, stigmate capitato leviter 3-lobato, lobis globosis facie muricatis. Semina oblique globoso-ovoidea  $\frac{1}{2}$  mm. longa fusco-rubra reticulata, reticulis hexagonis.

HAB. Montibus centralibus 10000 ped. alt., leg. U. MORI, Dec. 1908.

Differs from other species of the genus in its very small form. Here is another species which I could not examine. It is *Shortia tibetica* FRANCH. N. Arch. m. H. N. Paris 2 sér. X. 54.

## Primulaceæ.

### *Stimpsonia* WRIGHT.

**Stimpsonia chamædryoides** WRIGHT; FORBES et HEMSLE. Ind. Fl. Sin. II. p. 46.

HAB. Formosa: Loco non indicato. (Taihoku Museum).

DISTRIB. China, Corea and Lûchû.

### *Primula* LINN.

**Primula Miyabeana** ITO et KAWAK. in Coll. Bot. Pap. Miyabe (1911) p. 1.

HAB. Mt. Morrison, 12000 ped. alt.

## Myrsineæ.

*Mæsa* FORSK.***Mæsa formosana*** MEZ. in Pfl.-reich. p. 29.

HAB. Formosa et Liukiu.

*Myrsine* LINN.

***Myrsine microphylla*** HAYATA sp. nov. Rami graciles subeinascentes, ramulis gracillimis angulatis, ad angulos subulatis, facie inter alas minute hirsutis. Folia obovata vel cuneato-obovata usque ad  $1\frac{1}{2}$  cm. longa 7–8 mm. lata apice acuta ad summum mucronata basi cuneata ad petiolum attenuata margine a infra medium usque ad apicem aristato-serrulata, (serrulis utroque latere 4–7 a se circ. 2 mm. remotis ascendentibus incurvis  $\frac{1}{5}$  mm. longis), a infra medium usque ad basin integra, utraque pagine glabra subtus pallidiora supra ad costas breve hirsuta, costis et venis venulisque utraque pagine elevatis, subtus in exsiccatō nigro-punctata vel non punctata, petiolis 1 mm. longis supra planis hirsutis subtus glabris. Flores 5–6-fasciculati, fasciculis sessilibus ad axillas foliorum superiorum, basi perulatis, perulis oblongis apice obtusis  $\frac{1}{2}$  mm. longis margine ciliolatis, pedicellis brevibus  $1-\frac{1}{2}$  mm. longis. Calyx-tubus brevissimus  $\frac{1}{10}$  mm. longus 4–(vel 5?) lobatus, lobis angusto-oblongis  $\frac{1}{2}$  mm. longis apice obtusis margine ciliolatis crassiusculis utraque pagine rubro-punctatis, punctis 3–4. Corolla subcampanulata  $1\frac{1}{3}$  mm. longa, tubo  $\frac{1}{2}$  mm. longo, lobis 4 angustato-oblongis  $\frac{2}{3}$  mm. longis obtusis  $\frac{2}{3}$  mm. latis margine ciliolatis tenuibus rubro-punctatis, sinibus inter lobos latiusculis cum lobis aequalatis obtusis. Stamina 4 lobis corollæ opposita basi corollæ affixa, cum lobis corollæ æquilonga, partibus liberis filamentorum  $\frac{1}{2}-\frac{3}{4}$  mm. longis basi latissimis latioribus quam longioribus facie interiore et margine ciliolatis tenuibus, antheris linearibus  $\frac{3}{4}$  mm. longis basi reflexis apiculatis introrse dehiscentibus. Ovarium obovoideum  $\frac{3}{4}$  mm. longum apice ad stylum  $1\frac{1}{3}$  mm. longum abeuns, stylo columnari glabro, stigmate punctiformi. Fructus globosus 4 mm. in diametro siccus. Semina ignota.

HAB. Taitō: Daishizan, ad 6000 ped. alt., leg. U. MORI, Jan. 1908

(No. 4579 Fructus!); in Montibus Centralibus, leg. U. MORI, 1910 Dec. (Fruct.); Motsuu, leg. U. MORI, 1912, Juli. (Fr. et Fl.).

Near *Myrsine africana* LINN.; but differs from it by the not exerted anthers and smaller leaves with aristate serrature. I have examined several sets of the flowers and fruits, but I have never been able to find either ovule or seed. The plant may be of polygamous character, and the specimens may be male ones.

## Oleaceæ.

### *Chionanthus* LINN.

***Chionanthus serrulatus*** HAYATA sp. nov. (Tab. XXVIII.) Rami recti fusco-cinerascentes glabri, cortice  $\pm$  soluto lenticellis et cicatricibus foliorum notato, ramulis rectis gracilibus pubescentibus complanatis, facie 2-sulcatis cicatricibus foliorum elevatis pulviniformibus. Folia obovato-oblonga rotundato-obovata usque ad 5 cm. longa 2.5–3 cm. lata apice obtusa vel rotundata ad summum retusa vel emarginata basi rotundata obtusa vel cuneata chartacea vel interdum membranacea margine serrulata prope basin integra, serrulis obtusis, venis primariis lateralibus utroque latere 5–6 subrectis apice furcatis a costa angulo 45° divaricatis tenuibus utraque pagine elevatis vel non elevatis, venulis secundariis minute reticulatis, utraque pagine subglabra ad costas et venas leviter hirsuta, petiolis circ. 1 cm. longis supra plano-sulcatis. Flores ad apicem ramulorum paniculati. Panicula terminalis basi perulata, perulis minutis triangularibus apice cuspidatis, pedunculis paniculorum ad apicem ramulorum solitariis vel geminis vel ternatim sitis, floribus ad apicem pedunculorum umbellatim 3–10 dispositis, pedunculis gracillimis glabris 3–4 cm. longis interdum ternatim-ramosis interdum eramosis; umbella florum ad apicem pedunculorum 3–10-florata, radiis (pedicellis) 5–10 mm. longis gracillimis (bracteis nullis). Calyx alte 4-lobus, lobis lineari-lanceolatis glabris margine minute obsoleteque denticulatis vel integris utraque pagine 1-costatis 2 mm. longis basi  $\frac{1}{2}$  mm. latis suberectis. Corolla alte 4-lobata, tubo 2½ mm. longo subcampanulato, lobis 4 spathulato-linearibus 12–13 mm. longis versus apicem latioribus 2½ mm. latis apice rotundatis deorsum leviter grada-



tim angustatis a basi 1 mm. latis tenuiter 1-costatis, (costis cum venis laterali-bus tenuibus subparallelis, extrorse recurvatis revolutis, sinibus inter corollæ lobos acutis. Stamina 2 ad basin corollæ tubi affixa, filamentis toto cum corolla connatis, antheris adnatis oblongo-ovatis 1 mm. longis extrorse dehiscen-tibus apiculatis glabris. Rudimentum ovarii 0. Fl. ♀ ignoti.

HAB. Tōyenchō: Kappanzan, leg. U. MORI et Y. SHIMADA, 1910, Mart. (Fl.).

Closely resembles *C. retusus*, but differs from it by the much shorter petioles and minutely serrulate leaves. There is another specimen of this genus in the Tōkyō herbarium, which is labelled "Kōshū: Giokuzan, Mai., 1910, China." It is closely allied to our species, and may be regarded as identical with ours. The genus exists in North America, China and Japan (BENTH et HOOKER Gen. Pl. II. p. 677). Four species including the present one are known.

## Apocynaceæ.

### *Tabernæmontana* LINN.

#### **Tabernæmontana dichotoma** ROXB.

HAB. Kōtōshō.

Determined by Mr. T. KAWAKAMI at Manila in his trip to the Philip-pines.

## Loganiaceæ.

### *Geniostoma* FORST.

#### **Geniostoma** sp.

HAB. Kwashōtō.

Specimens insufficient for satisfactory determination.

### *Fagraea* THUNB.

**Fagraea Sasakii** HAYATA n. sp. (Tab. XXIX). Arbor 10 m. alta vel altiora, rami et ramuli in exsiccato albo-cinerascentes glabri plus minus succulenti.

Folia opposita crassiuscula approximata oblonga oblongo-obovata vel oblongo-ovata usque ad 10 cm. longa  $4\frac{1}{2}$  cm. lata  $\pm$  obliqua apice breve cuspidata ad summum obtusa vel simpliciter obtusa basi cuneata ad extremitatem attenuata utraque pagine glabra, costa supra plana subtus prominenti basi latiuscula ad petiolum abeunti, venis et venulis non conspicuis vel tenuissimis leviter elevatis, pagine supra subglauco-nitida subtus pallidissima, petiolis 1-2 cm. longis basi subito dilatatis stipulam formantibus, stipulis cum petiolis connatis sub-intra-petiolaribus. Flores solitarii terminales, pedunculis validis 2 cm. longis infra medium 2-bracteatis, bracteis oppositis triangularibus 5 mm. longis crassiusculis. Sepala (vel segmenta calycis) 5 subrotundata 6 mm. longa valde imbricata margine hyalina. Corolla (alba?) infundibuliformis crassiuscula  $4\frac{1}{2}$  cm. longa 5 cm. in diametro, tubo cylindrico-campanulato 3 cm. longo, lobis 5 patentibus rotundato-oblongis 2 cm. longis  $1\frac{1}{2}$  cm. latis apice rotundatis basi non vel leviter contractis margine integris vel obscure denticulatis tenuibus, venis et venulis longitudinaliter reticulatis. Stamina 5, filamentis a basi usque ad medium cum corollæ tubo adnatis, partibus liberis 1 cm. longis complanatis, antheris oblongis 8 mm. longis 4 mm. latis utrinque obtusis basi alte 2-lobatis, lobis arete approximatis, dorsifixis apice obtusis connectivis leviter visis, connectivis linearibus, loculis 2 solidis. Ovarium ovoideum glabrum 5 mm. longum apice ad stylum  $1\frac{1}{2}$  cm. longum attenuatum, stigmate dilatato cupuliformi. Bacca ovoidea  $3\frac{1}{2}$  cm. longa apice acuta breve apiculata viridis, sub exocarpio gummi exudens.

HAB. Kōshūn : Hieranzan, leg. B. HAYATA et S. SASAKI, Aug. 1912, fructus !; S. SASAKI, Feb. 1909, flores !

Near *Fagraea obovata* WALL., but differs from it in having much thinner shorter and broader leaves with an obtusely cuspidate apex. The structure of the anther-cells is very peculiar. They are perfectly solid, and in cross section there is seen practically no room for pollens. The anthers are apparently constituted of parenchymatous cells with numerous trabecules. On the surface of the anther-cells, there is a slit or rather a groove, and there we can find some pollens evidently scattered along the groove.

## Boragineæ.

*Ehretia* LINN.

***Ehretia glaucescens*** HAYATA sp. nov. Arbor: truncus erectus, versus apicem ramosus. Rami teretes, cicatricibus foliorum elevatis. Folia obovato-oblonga vel obovato-lanceolata apice abrupte acuminata vel breve caudata basi cuneata attenuata supra medium latissima 11 cm. longa 4 cm. lata in vivo supra viridissima nitida subtus glauca chartaceo-membranacea, in exsicco opaca, integerrima, venis lateralibus primariis utroque latere costæ 4-5 tenuissimis in vivo non visis, in exsicco utraque pagine tenuissime elevatis, petiolis 1- $\frac{1}{2}$  cm. longis supra sulcatis. Flores paniculato-cymosi albi. Cymæ terminales paucifloratæ, (exceptis pedunculis) 2-3 cm. longæ totiusque latæ, pedicellis ultimis 5-3 mm. longis interdum brevissimis subnullis apice peltato-dilatatis cum floribus articulatis, bracteis et bracteolis nullis. Calyx subglobosus vel obovatus 1 $\frac{1}{2}$  mm. longus vel longior utrinque glaber 5-lobatus, lobis rotundatis vel oblongis apice obtusis vel rotundatis  $\frac{1}{2}$ - $\frac{2}{3}$  mm. longis. Corolla campanulato-hypocratheriformis utrinque glabra, tubo 4-5 mm. longo basi 1 mm. lato, apice gradatim dilatato, apice 3 mm. lato, limbo 5-lobato, lobis obovatis vel oblongis apice rotundatis 2-3 mm. longis integris reflexis. Stamina 5 ad medium tubi affixa longe exserta cum lobis corollæ alterna, filamentis vel partibus liberis filamentorum 5 mm. longis reflexis filiformibus, antheris late globosis a dorso compressis didymis, loculis fere distinctis a dorso medio leviter connatis  $\frac{3}{4}$  mm. latis. Ovarium ovoideum 1 mm. longum glabrum, stylo 7-8 mm. longo filiformi apice 2-lobato glabro, lobis 1-2 mm. longis apice  $\pm$  dilatatis truncatis stigmatosis. Fructus globosus 1 cm. in diametro 4-pyrenus, pyrenis late oblongis 6-7 mm. longis 5 mm. latis complanatis leviter recurvis dorso irregulariter alte reticulate foveolatis facie planis vel alte foveolatis. Semina non visa.

HAB. Kizan prope Mai, leg. B. HAYATA et S. SASAKI, Juli., 1912.

Near *E. longifolia* CHAMP; but differs from it by the much smaller corolla and rounded calyx-lobes. Nothing like this in the Indian, Chinese, Honkong and Japanese flora.

The plant was first collected by Mr. S. SASAKI and myself at Kisan near Maisha. The greenish leaves, which are shining above, but glaucous beneath, remind me of those of the lauraceous plants. Flowers are white and scentless. I saw another example of this tree at Kappanzan.

**Ehretia longifolia** CHAMP.; BENTH. Fl. Hongk. p. 234; FORBES et HEMSL. Ind. Fl. Sin. II. p. 145.

*Ehretia laevis* MATSUMURA (non ROXB.) in MATSUM. et HAYATA Enum. Pl. Formos. p. 254.

HAB. Kusukusu, leg. C. OWATARI Mart. 1898; B. HAYATA et S. SASAKI Juli. 1912.

It was found by Mr. S. SASAKI and myself at a sunny place on a mountain ridge at Kusukusu. This is the only example I have ever seen in my excursions. The flowers are perfect white. They are much shorter than those described in BENTH. Fl. Hongk. Tube of the corolla is 1 cm. long, lobes are 4 mm. long.

## Solanaceæ.

### *Cestrum* LINN.

**Cestrum nocturnum** LINN. cult.

## Gesneraceæ.

### *Chirita* HAM.

**Chirita bicornuta** HAYATA sp. nov. Herba circ. 1 m. alta vel minus alta; caulis glaber succulentus erectus sursum foliosus in exsiccato minute fusco-maculatus sursum leviter pubescens demum glabratus; folia radicalia non visa. Folia caulina opposita aequalia vel obliqua oblango-lanceolata vel oblanceolata lanceolata longe petiolata membranacea 10-15 cm. longa  $2\frac{1}{2}$ -4 cm. lata apice acuminata basi acuta vel cuneato-attenuata gradatim ad petiolum abeuntia margine subintegra vel tenuissime obscureque dentata,

dentibus brevissimis, supra viridia subtus pallida subtus præter nervas et venis-que glabra (sed ad nervos et venas pubescentia), supra ad costas et venas non pubescentia sed ad paginam tenuissime pubescentia, venis lateralibus primariis utroque latere costæ 10-9 arcuatis, petiolis longis vel brevioribus 2-4 cm. longis pubescentibus. Cymæ pauci- (sæpe 2-) floratæ axillares oppositæ pedunculatæ, pedunculis  $2\frac{1}{2}$  cm. longis, bractea una sub pedicello singulo sita, bracteis cum iis florum oppositorum connatis late ovatis rotundatis  $1\frac{1}{2}$  cm. longis florem amplexantibus margine integris apice rotundatis, pedicellis 4 mm. longis inerassatis. Calyx alte 5-lobatus, lobis late oblongis 8 mm. longis 4 mm. latis apice obtusis ad summum reflexis. Corolla cylindrico-campanulata obliqua in latere superiore 4 cm. longa in latere inferiore  $4\frac{1}{2}$  cm. longa, basi 6 mm. lata ad apicem limbi  $2\frac{1}{2}$  cm. lata fere  $\pm$  incurva supra basin ampliata, sursum 2-labiata, (labio superiore 2-lobato, labio inferiore 3-lobato, lobis omnibus rotundatis), extus glabra intus latere anteriore (præter partem apicalem et basilarem) hirsuta basi annulariter 6 mm. supra basin hirsuta, cæterum glabra. Stamina corollæ tubo affixa; 2 anteriora perfecta, filamentis complanatis 2 cm. longis glabris ascendentibus crispato-recurvatis, antheris late cordato-rotundatis  $3\frac{1}{2}$  mm. latis apice rotundatis basi emarginatis, loculis apice confluentibus; stamina posteriora sterilia, filamentis recurvatis 5 mm. longis, antheris 0. Ovarium cylindricum glabrum 8 mm. longum apice gradatim ad styum abeuns, stylo glabro ascendenti-erecto 11 mm. longo apice brevissime descendente-recurvo truncato, stigmate terminali. Discus annularis 1 mm. altus margine obscure denticulatus. Capsula (sæpe in paria) cornuformis oblique ascendens cylindracea 22 mm. longa 4 mm. lata apice rostrata basi non contracta, valvis 2 interdum ad suturam superiorem a se dehiscentibus, ad suturam inferiorem continuatis vel se solutis. Semina minutissima circ.  $\frac{1}{2}$  mm. longa angulari-oblonga, altra extremitate acuta, altra truncata, vel utraque acuta longitudinaliter multi-costata et transverse reticulata.

HAB. Rinkihō, ad 5000 ped. alt., leg. H. INABA, 1911, Aug., (Typus! Fl.); Mt. Arisan, leg. B. HAYATA et S. SASAKI, 1912, Jan. (Fr.).

This has large ovate connate bracts like *C. eburnea* HANCE (in Journ. Bot. (1883) p. 168.).

## Nyctagineæ.

*Pisonia* LINN.

***Pisonia excelsa*** BL.; HOOK. Fl. Brit. Ind. IV. p. 711; MATSUM. Ind. Pl. Jap. II.-2, p. 75.

HAB. Kōshūn: Kuraru, leg. B. HAYATA, Mai. 1912. Loo-choo: Takarashima (No. 124), Yæyama: Ishigakijima, leg. KANASHIRO; Platas, leg. T. KAWAKAMI.

***Pisonia morindæfolia*** R. BR. =(P. *alta*).

HAB. Platas, leg. T. KAWAKAMI.

Determined by Mr. T. KAWAKAMI at Manila in his trip to the Philippines.

## Rafflesiaceæ.

TRIB. *Mitrastemoneæ*.

(ENGL. Bot. Jahrb. LI. Heft-1, p. 173.)

*Mitrastemon* MAKINO.

***Mitrastemon Kawasasakii*** HAYATA in Tōkyō Bot. Mag. XXVI. p. 112.

As to the comment of this being referred to the Rafflesiaceæ, see the separate heading "On the systematic Position of *Mitrastemon*, as a Genus representing a special Tribe of the Rafflesiaceæ" in this volume p. 299 and also "Über die systematische Stellung von *Mitrastemon*, als einer neuen Gattung and besonderen Tribus der Rafflesiaceen," appeared in ENGL. Bot. Jahrb. LI., Heft-1, pp. 164-176, Taf. I.

## Myristiceæ.

*Myristica* LINN.

***Myristica simiarum*** A. DC.

HAB. Formosa: Loco non indicato (Herb. Taihoku Museum).

## Laurineæ.

*Cryptocarya* BR.

**Cryptocarya Konishii** HAYATA Mater. Fl. Formos. p. 237. Descriptio auctata: Flores hermaphroditi paniculati, paniculis 6 cm. longis, (pedunculis 3 cm. longis) sursum ramosissimis, pedicellis (ramis ultimis) 1-2 mm. longis toto hirsutis. Calyx subcampanulatus basi tubuliformis hypocrateriformis, tubo 1 mm. longo, limbo 6-lobato, lobis 2-seriatim 3-meris oblongis obtusis basi  $\pm$  contractis valde imbricatis apice rotundatis  $2\frac{1}{2}$  mm. longis utrinque hirsutis. Stamina perfecta 9 fance tubi affixa, (filamentis basi hirsutis  $1\frac{1}{2}$  mm. longis, antheris oblongis circ. 1 mm. longis, connectivis valde productis, partibus productis  $\frac{1}{3}$  mm. longis totiusque latis), ordinis primarii et secundarii eglandulosa, ordinis tertii utrinque glandula stipitata auctata; antheris ordinis primarii et secundarii introrsum 2-locellatis, ordinis tertii introrsum 2-locellatis; staminodia ordinis quarti triangulari-lanceolatis  $1\frac{1}{2}$  mm. longis. Ovarium perianthii tubo inclusum longe obovatum apice attenuatum  $1\frac{1}{3}$  mm. longum 1-ovulatum, stylo breviter exserto  $1\frac{1}{2}$  mm. longo, stigmate oblique truncato.

HAB. Uraisha, 1910.

It is rather doubtful whether the stamens with gland-like bodies are those of the third order, or those of the second order.

*Cinnamomum* BURMAN.

**Cinnamomum acuminatissimum** HAYATA sp. nov. Rami graciles, in exsiccato fuscentes. Folia tenuiter coriacea oblanceolata ovato-lanceolata vel oblongo-lanceolata 9 cm. longa  $2\frac{1}{2}$ -3 cm. lata apice longe acuminata ad summum obtusa basi cuneata supra nitida subtus subglaucescentia pinninervia, costis et venis utraque pagine tenuiter elevatis, venis lateralibus primariis utroque latere costæ 5-6 basilaribus a costa angulo  $20^\circ$  egressis, petiolis 1- $1\frac{1}{2}$  cm. longis supra late sulcatis. Flores paniculati, paniculis terminalibus a basi ramosis 3 cm. longis. Perianthium campanulato-rotatum utrinque pubes-

cens, tubo 1 mm. longo, limbo 6-lobato, lobis elongato-lanceolatis apice obtusis  $2\frac{1}{2}$  mm. longis, tubo intus dense barbato. Stamina perfecta 9, 2 mm. longa, (filamentis subglabris vel ad basin hirsutis), ordinis I. et II. eglandulosa, antheris introrsum 4-locellatis, ordinis III. glandulis stipitatis utroque latere basis filamentorum instructa, antheris extrorsum 4-locellatis; staminodia ordinis IV. 1 mm. longa apice subsagittiformia. Ovarium glabrum ovoideum  $\frac{2}{3}$  mm. longum, stylo  $1\frac{1}{2}$  mm. longo.

HAB. Taishō: leg. FURUKAWA, 1910, Mart., (Fl.).

**Cinnamomum camphoroides** HAYATA sp. nov. Rami glabri fulvescentes. Folia versus apicem ramulorum disposita ovato-oblonga usque ad 8 cm. longa  $2\frac{1}{2}$  cm.— $3\frac{1}{2}$  cm. lata apice acuminata vel acuta ad summum obtusa basi acuta tenuiter coriacea vel chartacea 3-nervia (nervis supra basin usque ad 5 mm. connatis) supra nitida, (nervis et venis utraque pagine tenuiter elevatis, nervis lateralibus rectis), petiolis 2–3 cm. longis. Flores cymoso-paniculati, paniculis terminalibus 5 cm. longis 6 cm. latis, (in alabastro globosis), perulis rotundatis 7 mm. longis totiusque latis extus sericeo-tomentosis intus tenuiter hirsutis), pedicellis 3 mm. longis, bracteis ovatis  $\frac{1}{2}$  mm. longis hirsutis. Perianthium campanulato-rotatum 5 mm. in diametro, tubo circ. 1 mm. longo, lobis rotundato-oblongis intus dense hirsutis, cæterum ut *C. Camphoræ*.

HAB. Kōshūn: leg. N. KONISHI.

Differs from *C. Camphora* by the terminal densely flowered panicles.

**Cinnamomum insulari-montanum** HAYATA sp. nov. Rami et ramuli glabri recti graciles. Folia glaberrima tenuiter coriacea oblonga vel ovato-oblonga 6 cm. longa 22 mm. lata apice obtuso-acuta acuta acuminata ad summum acuta vel obtusa basi obtusa ad extremitatem breve attenuata ad petiolum abeuntia supra nitida subtus glauca 3-nervia, venis nervi centralis utroque latere 2, nervis lateralibus rectis a costa angulo  $20^\circ$  divaricatis, nervis et venis utraque pagine tenuissime elevatis, subtus venulis tenuiter reticulatis, petiolis 8–10 mm. longis supra late sulcatis. Cymæ



terminales 3 cm. longæ totiusque latæ, ramis patentibus 2½ cm. longis apice 3-natis florem gerentibus, pedicellis (ramis ultioribus) 6-7 mm. longis. Perianthium campanulato-hypocratheriforme 4 mm. longum, tubo 1 mm. longo totiusque lato, limbo 6-lobato, lobis oblongis extus glabris intus dense hirsutis 2½ mm. longis apice obtusis basi ± contractis. Stamina perfecta 9, fauce tubi affixa 2 mm. longa, filamentis basi hirsutis 1½ mm. longis vel subglabris, antheris truncato-oblongis 1 mm. longis apice truncatis vel ± emarginatis, connectivis non productis, ordinis primarii et secundarii introrsum 4-locellatis, ordinis tertii extrorsum 4-locellatis; stamina ordinis tertii medio filamentorum utroque latere glandula sessili (glandulis antheræformibus oblongis) instructa; staminodia ordinis quarti 1½ mm. longa apice dilatata sagittæformia hirsuta. Ovarium ovoideum 1 mm. longum, apice ad stylum 1½ mm. longum abeuns, stylo apice dilatato infundibuliformi 3-lobato.

HAB. Monte centrali, leg. U. MORI, Dec. 1909.

Near *C. Döderleinii* ENGL., differs from it by the glabrous flowers and ovately oblong leaves.

**Cinnamomum Kanahirai** HAYATA sp. nov. Rami validiusculi, ramulis validiusculis glabris fusco-purpurascensibus in exsiccato. Folia coriacea oblonga ovato-oblonga usque ad 7 cm. longa usque ad 4 cm. lata apice subito acuminata vel acuminata basi obtusa rotundata acuta ad extremitatem subito-acuta pinnivena vel 3-nervia vel 5-nervia, (nervis basilaribus tenuissimis, nervis lateralibus supra basin usque ad 3 mm. connatis), supra subnitida, costis et venis utraque pagine tenuiter elevatis, venulis minutissime reticulatis vix conspicuis, petiolis 1-2 cm. longis sursum subalatis supra late sulcatis. Flores ignoti. Tubus perianthii fructifer persistens campanulato-cupuliformis 1 cm. in diametro. Bacca depresso-globosa 13 mm. longa 15 mm. in diametro apice depresso-truncata. Semina globosa 10 mm. in diametro testa crustacea.

HAB. Nanshōshichō: Kali-zenzan, ad 4000 ped. alt., Oct. 1912, leg. R. KANAHIRA.

Near *C. micranthum* HAYATA, but differs from it by the much larger fruits and in the leaves which are sometimes 3-nerved, and strong scented.

**Cinnamomum macrostemon** HAYATA sp. nov. Ramuli recti graciles glabri. Folia chartacea supra subnitida subtus opaca ovato-lanceolata ovato-oblonga vel oblongo-lanceolata apice acuminata ad summum obtusa basi acuta vel subito acuta 10 cm. longa 3 cm. lata trinervia, nervis lateralibus supra basin usque ad 3 mm. connatis, nervis et venis supra tenuibus subtus tenuiter prominentibus, venis primariis lateralibus et venulis tenuissimis, petiolis 1 cm. longis supra late sulcatis. Flores cymoso-paniculati, paniculis axillaribus vel terminalibus 2-3 cm. longis, rhachidibus pubescentibus tetragonis, pedicellis 4-5 mm. longis. Perianthium late campanulato-rotatum utrinque pubescens alte 6-lobatum, lobis angustato-elongato-oblongis 6 mm. longis 2 mm. latis apice obtusis. Stamina perfecta 9, 5 mm. longa, (filamentis hirsutis, antheris angustatis 2 mm. longis  $\frac{1}{2}$ - $\frac{2}{3}$  mm. latis); ordinis I. et II. glandulosa, antheris introrsum 4-locellatis; ordinis III. utroque latere glandula sessili ad medium filamentorum instructa, antheris extrorsum 4-locellatis; staminodia ordinis IV. 3 mm. longa apice sagittæformia hirsuta. Ovarium obovoideum 1 mm. longum, stylo 3 mm. longo, stigmate dilatato 3-lobato.

HAB. Tainan, leg. S. NAGASAWA, Aprili. 1910, (No. 155).

**Cinnamomum micranthum** HAYATA n. n.

*Machilus micranthum* HAYATA, Ic. Pl. Formos. II. p. 130.

**Cinnamomum nominale** HAYATA n. n. *Cinnamomum Camphora* NEES et EBERM. var. *nominale* HAYATA in MATSUMURA et HAYATA Enum. Pl. Formos. p. 349. Suffrutex semper humilis 1 m. alta nunquam altior nunquam arborescens. Rami in exsiccato fuscentes ramosi. Folia tenuiter coriacea vel chartacea oblonga oblongo-orata vel oblongo-rhomboidea usque ad 7 cm. longa circ. 2-3 cm. lata, apice acuminata basi vel subito attenuata vel cuneata 3-nervia, nervis basi supra basin 1 cm. connatis, (præterea nervis basilaribus tenuissimis a basi distinctis), supra nitida subtus opaca, (venis secundariis transversis utraque pagine tenuissimis non elevatis, nervis utraque pagine tenuissime elevatis) margine nervo-marginata, petiolis 1-2 cm. longis supra sulcatis. Flores cymosi, cymis pauci- et laxi-floratis axillaribus 3-6 cm. longis. Perianthium subrotatum

4 mm. in diametro late 6-lobatum, lobis extus subglabris intus hirsutis oblongis 1 mm. latis obtusis. Stamina perfecta 9, I. et II. ordinis eglandulosa, antheris introrsum 4-locellatis, ordinis III. glandulis stipitatis instructa, antheris extrorsum 4-locellatis; ordinis IV. staminodia rhomboideo-cuspidiformia stipitata. Ovarium globosum, stigmate dilato. Calycis Tubi fructiferi campanulato-cupuliformes 4-5 mm. in diametro; baccis globosis 6 mm. in diametro basi rostratis.

HAB. Kōshūn, Kuraru, leg. B. HAYATA, Mai. 1912.

This was described as a variety of the common camphor tree. It is a shrub nearly 1 m. high. It does not produce camphor. The flowers are a little smaller than those of the camphor tree. The apical portions of staminal nodes are not sagittate, but rhombic. It is better be regarded as specifically distinct from the latter.

**Cinnamomum obovatifolium** HAYATA sp. nov. Rami glabri. Folia obovata tenuiter coriacea 3-4 cm. longa 1-2 cm. lata apice rotundata obtusa vel rarius acuta basi obtusa vel cuneata supra subnitida subtus subglauca pinninervia, costis et venis supra planis non elevatis, subtus tenuissime elevatis sed distincte coloratis, venulis minute reticulatis, venis lateralibus primariis utroque latere costæ 4 apice arcuatis cum venis superioribus areolam formantibus, petiolis brevibus 5 mm. longis supra late sulcatis. Cymæ axillares pauce-floratæ 2 cm. longæ. Perianthium 6-lobatum extus glabrum intus subglabrum basi barbatum. Cæterum ut *C. Camphoræ*.

HAB. Kusukusu, leg. B. HAYATA et S. SASAKI, 1912, Juli.

Near *C. reticulatum* HAY., but differs from it by the pinninerved leaves and much smaller flowers.

**Cinnamomum pseudopedunculatum** HAYATA sp. nov. Rami et ramuli recti graciles rubescentes vel pallidiusculi. Folia in magnitudine et forma variabilissima tenuiter coriacea ovata oblonga ovato-oblonga vel ovato-lanceolata apice obtusissima obtusa acuta vel acuminata, sed ad summum semper obtusa, basi rotundata obtusa acuta breve attenuata 4-9 cm. longa  $1\frac{1}{2}$ - $4\frac{1}{2}$  cm. lata 3-nervia, nervis basi usque ad 5-10 mm. connatis, præterea 2 nervis basilaribus tenuibus a basi solutis, nervis et venis utraque

pagine leviter elevatis vel supra planis basi reticulatis, venis transversis non distinctis, supra nitida subtus  $\pm$  glauca, petiolis 1-2 cm. longis complanatis supra late sulcatis sursum  $\pm$  alatis. Cymæ paucifloratæ 3-floratæ pedunculatæ axillares, pedunculis 1 cm. longis glabris. Perianthium 5-lobatum, lobis 6 oblongo-rotundatis 2 mm. longis apice obtusis extus glabris intus hirsutis margine sub microscopio denticulatis. Stamina perfecta 9, filamentis hirsutis, ordinis tertiis glandulis sessilibus utroque latere medio instructis; staminodia sagittæformia. Ovarium ovoideum apice ad stylum abeuns, stigmate capitato 3-lobato. Pedunculi fructiferi erecti  $1\frac{1}{2}$  cm. longi, pedicellis fructiferis  $1\frac{1}{2}$  cm. longis erectis, tubo perianthii persistenti dilatato cupuliformi 4 mm. in diametro. Fructus ellipsoideus 8 mm. longus apice rotundatus ad centrum 1-punctatus.

HAB. Bonin: Chichijima et Hahajima, leg. H. HATTORI, 1905, Aug.

Near *C. pedunculatum*, but differs chiefly by the venation of the leaves, shorter peduncles and less-flowered cymes.

### *Machilus* NEES.

***Machilus longipaniculata*** HAYATA sp. nov. (Tab. XXX.) Rami in exsiccato nigricantes glabri. Folia lanceolata obovato-lanceolata vel oblongo-lanceolata tenuiter coriacea vel chartacea apice acuminata basi cuneato-obtusa 10-13 cm. longa 3-3½ cm. lata, in exsiccato utraque pagine opaca,  $\pm$  rubescentia subtus  $\pm$  glauca, pinninervia, costis supra impressis subtus elevatis, venis lateralibus primariis tenuissimis, petiolis 2 cm. longis. Paniculæ longissimæ 10-20 cm. longæ, ad axillas foliorum superiorum, pedunculis longissimis, ramis brevibus  $1\frac{1}{2}$  cm. longis, ad apicem ramorum floribus 3-6-fasciculatim dispositis, pedicellis ultimis 4 mm. longis. Perianthium 6-lobatum, lobis patentissimis extus breve hirsutis intus parcissime hirsutis exterioribus anguste oblongis 3½ mm. longis apice obtusis interioribus latioribus, tubo dense hirsuto. Stamina perfecta 9, 2 mm. longa, filamentis glabris. Ovarium cum stylo glabrum.

HAB. Uraisha, leg. N. KONISHI, 1910, Mart. (Fl.).

***Machilus longisepala*** HAYATA sp. nov. Rami graciles in exsiccato fuscentes. Folia tenuiter coriacea vel chartacea, oblongo-oblanccolata apice



Fig. 21.

*Actinodaphne citrata* (BLUME.) 1, a branch; 2, a leaf; 3, a flower-umbel; 4, a bract; 5, a flower; 6, 7, calyx-lobes; 8, limb of the calyx, expanded; 9, 10, stamens of one kind, seen from different sides; 11, 12, stamens of another kind; 13, 14, 15, stamens of another kind; 16, a rudimentary ovary; 17, a branch with a fruit; 18, a fruit; 19, vertical section of the same. Fig. 1, 2 and 17,  $\times \frac{1}{4}$ ; others are variously magnified.

acuta vel acuminata ad summum obtusa basi cuneata vel cuneato-obtusa 6-8 cm. longa 2 cm. lata, costis supra sulcatis subtus prominentibus, venis lateralibus primariis tenuissimis subtus leviter elevatis, petiolis 1 cm. longis supra late sulcatis. Paniculae 4-5 ad apicem ramorum fasciculatae 8 cm. longae, pedunculis 5 cm. longis, ramis 1-1½ cm. longis, floribus ad apicem ramorum 2-3-4- fasciculatim dispositis, pedicellis ultimis 3 mm. longis. Perianthium 6-lobatum utrinque hirsutum, lobis oblongis. Stamina perfecta 9, staminodia 3.

HAB. Kusukusu.

### *Notaphæbe* BLUME.

**Notaphæbe Konishii** HAYATA n. n. = *Machilus Konishii* HAYATA Mater. Fl. Formos. p. 240.

The plant should better be referred to *Notaphæbe*, for the staminodes of the fourth order are very small and subulate, the segments of the perianth are rather thin, and the plant does not look like a species of the *Machilus* allies.

### *Actinodaphne* NEES.

**Actinodaphne citrata** (BLUME.) (Fig. 21.). = *Litsea citrata* BLUME; HAYATA Mater. Fl. Formos. p. 247.

OBSERV. Rami glabri nigricantes, ramulis gracilibus. Folia alterna petiolata subpersistencia membranacea lanceolata 7 cm. longa 16 mm. lata apice acuminata basi acuta vel obtusa, costis et venis utrinque paullum elevatis, venis primariis gracillimis, petiolis 8 mm. longis. Umbellae florum racemose dispositae, racemis axillaribus 1½ cm. longis, pedicellis umbellarum 8 mm. longis, vel racemis in umbellam unam reductis. Umbellae 4-floratae, basi bracteis 4 persistentibus globosis 4 mm. longis 5-nervatis apice rotundatis membranaceis glabris. Perianthium 6-partitum glabrum, segmentis late ovatis obtusis 2 mm. longis 1½ mm. latis integris vel denticulatis. Stamina 9 omnia perfecta 2 mm. longa segmento perianthii aequalia, filamentis glabris linearibus, ordinis primarii et secundarii eglandulosa, ordinis tertii glandula breve stipitata utrinque aucta, antheris omnibus introrsum 4-locellatis. Rudimentum ovarii minutum. Fl. ♀: ignoti. Bacca globosa nigricans 5 mm. longa, perianthii tubo non accrescenti insidens, segmentis calycis deciduis.

**Actinodaphne morrisonensis** HAYATA n. n. *Litsea morrisonensis*  
HAYATA Mater. Fl. Formos. p. 250.

**Actinodaphne nantensis** HAYATA n. n. *Litsea nantensis* HAYATA  
Mater. Fl. Formos. p. 251.

*Litsea* LAM.

**Litsea Kawakamii** HAYATA sp. nov. Arbor, ramis robustis subglabris. Folia alterna in magnitudine variabilia ovato-lanceolata vel obovato-lanceolata vel lanceolata 25–40 cm. longa 6–15 cm. lata apice obtusa cuneato-obtusa vel acuta basi cuneata ad petiolum decurrentia chartacea vel chartaceo-membranacea vel chartaceo-coriacea margine integra utraque pagine glabra subtus glauca, costa supra plana 4 mm. lata subtus prominenti, venis lateralibus supra planis subtus elevatis gracilibus utroque latere costae circ. 20 subrectis prope marginem evanescentibus a costa circ. 50° divaricatis, venulis minute reticulatis, reticulis utraque elevatis, margine integerrima, petiolis 2½ cm. longis supra late canaliculatis basi non incrassatis. Cymae axillares fructiferae acutae incrassatae, ramis incrassatis, pedicellis fructiferis valde acutis 1½ cm. longis validis cum calyce continuis. Cupula calycis fructiferi patelliformis 3 cm. in diametro 7 mm. alta, cicatricibus planis 17 mm. in diametro. Bacca compresso-globosa 3 cm. in diametro 22 mm. alta, in cupula insidens, 1-sperma primum alba demum rubra. Semina obovato-compresso-globosa 2½ cm. in diametro 2 cm. longa apice subplana basi rotundata, testa membranacea laevi; albumen 0, cotyledones semi-globosae, caudicula infra apicem immersa.

HAB. Kōtōshō, leg. Y. TASHIRO et T. KAWAKAMI, Aug. 1912.

Very imperfect specimen. Through the courtesy of Mr. E. D. MERRILL, Bureau of science, Manila, I was able to find that it belongs to *Litsea* and is closely allied to the Philippine *L. Garciae* VID. (in Rev. Pl. Vasc. Filip. p. 228). I have compared our specimens with the Philippine species, and found that ours are different from the Philippine, so far as I can judge through the description of the latter, in having cuneately based leaves and smaller fruits.

*Tetradenia* NEES.

***Tetradenia acuminatissima*** HAYATA. sp. nov. Rami graciles in exsiccatō fulvescentes glabri. Folia ovato-lanceolata vel lanceolata tenuiter coriacea vel chartacea 6–9 cm. longa 18–25 mm. lata apice gradatim acuminata vel subito acuminata ad summum obtusa basi obtusa vel acuta pinninervia, venis lateralibus primariis utroque latere costæ 5 a costa angulo variabilissimo egressis, costis supra elevatis subtus sub-planis, venis supra tenuissime sed distincte elevatis subtus planis distinctis, supra subnitida, petiolis 1–1½ cm. longis. Fl. ♂: alabastrum cymæ globosum axillare vel laterale, floribus fasciculatis, fasciculis breve pedunculatis; flores apertientes non visi; stamina 6. Fl. ♀: flores breve pedicellati 3–4-fasciculati, fasciculis sessilibus 2–4 ad pedunculos breves sitis, pedunculis lateralibus vel axillaribus brevissimis 3 mm. longis; fasciculis florum sessilibus basi 1-bracteatis, bracteis semi-rotundatis 1 mm. longis 2 mm. latis basi latere subauriculatis incrassatis; bracteis involucri fasciculorum rotundatis oblongis valde concavis 3 mm. longis basi contractis margine ciliatis dorso parce hirsutis, pedicellis 3 mm. longis dense hirsutis. Perianthium 4-lobatum, lobis concavis obovato-oblongis 2 mm. longis. Staminodia 6–8, exteriora eglandulosa linearia 1½ mm. longa hirsuta, interiora ± longiora utroque latere glandulis sessilibus instructa. Ovarium obovoideum 1 mm. longum, stylo æquilongo hirsuto, stigmatē oblique 2-lobato. Fructus globoso-ovoideus 7 mm. longus, perianthiis persistentibus, pedicellis hirsutis 1 mm. longis.

HAB. Tōzan, leg. G. NAKAHARA, 1907, Nov. (Fr.); Arisan, leg. S. SASAKI, 1911, Mart. Fl. ♀.

***Tetradenia acuto-trinervia*** HAYATA sp. nov. Rami fuscentes tenuiter pubescentes. Folia tenuiter coriacea lanceolata obovato-lanceolata 9 cm. longa 2½ cm. lata supra subnitida subtus glauca tenuiter adpresse longeque hirsuta apice caudato-acuminata acuminata basi acuta vel acuminata 3-nervia, nervis lateralibus usque ad 5 mm. supra basin connatis angulo acuto a nervo centrali divaricatis, nervo centrali supra tenuiter elevato, nervis lateralibus supra impressis, nervis venisque subtus prominentibus, venulis transversis,



petiolis  $\frac{1}{2}$ –1 cm. longis supra subplanis. Flores apertientes non visi, fasciculis florum lateralibus vel axillaribus. Stamina 6, 4-locellatis.

HAB. Mt. Morrison, leg. U. MORI, 1907, Oct. Fr.

**Tetradenia aurata** HAYATA n. n. = *Litsea aurata* HAYATA Mater. Fl. Formos. p. 246.

**Tetradenia Konishii** HAYATA n. n. = *Litsea Konishii* HAYATA Mater. Fl. Formos. p. 248.

**Tetradenia variabilissima** HAYATA sp. nov. Arbor. Folia obovato-lanceolata elongato-obovata ovato-lanceolata vel lanceolata vel obovata vel ovata, 8–15 cm. longa circ. 4 cm. lata apice acuminata vel subito acuta, basi cuneato-attenuata cuneata vel acuta vel obtusa trinervia tenuiter coriacea, nervis lateralibus usque ad supra basin 5–15 mm. connatis, nervis et venis supra tenuiter impressis vel elevatis subtus prominente elevatis, supra nitida subtus glauca primum tenuiter adpresse hirsuta demum glabra. Fl. ♀ breve pedicellati, 2–4-fasciculati, fasciculis axillaribus vel lateralibus bracteis 4–5 involucreatis sessilibus 5–6 brevissime spicatum dispositis, spicis brevissimis 3 mm. longis, bractea una basi fasciculorum sita semirobundata  $2\frac{1}{2}$  mm. longa; bracteis involucri elongato-rotundatis 4 mm. longis in numero 4–5, pedicellis 2 mm. longis dense hirsutis. Perianthium 4-lobatum, lobis rotundatis extus hirsutis intus glabris. Staminodia 6–9, alia subulata  $1\frac{1}{2}$  mm. longa eglandulosa, alia utroque latere basi glandulis stipitatis instructa. Ovarium ovatum, stylo hirsuto, stigmate lato. Fructus elliptico-globosus 8 mm. longus.

HAB. Arisan, leg. B. HAYATA, Jan. 1911.

### *Lindera* THUNB.

**Lindera strychnifolia** VILLAR; FORBES et HEMSL. Ind. Fl. Sin. II. p. 392.

HAB. Fokien: Isan, leg. S. NAGASAWA, 1910, Aprili.

## Balanophoreæ.

### *Balanophora*

**Balanophora formosana** HAYATA sp. nov. Planta 20 cm. alta simplex dioeca cylindrico-teres. Volva obconico-turbinata 3 cm. in diametro totiusque longa apice depressa basi subito-acuta facie profunde rugoso-verrucosa. Scapi 16 cm. longi a basi usque ad medium imbricatim squamiferi, squamis imbricatis in magnitudine variabilissimis, inferioribus brevioribus, superioribus longioribus, lanceolatis apice obtusissimis. Spicæ fl. ♂: cylindræ 10 cm. longæ (pedunculis exceptis) 1½ cm. latæ (cum floribus), floribus dense dispositis, bracteis 0. Alabastrum florum ♂ depresso-globosum supra basin constrictum. Perianthii tubus brevissimus ½ mm. longus, inter tubum et limbum leviter constrictus. Fl. ♂ apertientes sessiles 6½ mm. in diametro; perianthii segmenta 6-5-4 valvata ovato-oblonga vel polygonia 2½ mm. longa apice obtuso-acuta vel truncata. Stamina 10-12 sessilia connata. Spicæ fl. ♀: cylindræ-obelavatifformes 7-8 cm. longæ medium 2 cm. latæ infra medium latissimæ, facie corporibus dense dispositis, corporibus late claviformibus 1 mm. longis basi stipitiformibus apice truncatis a centro depressis, basi ovariis multis instructis.

HAB. Formosa meridionalis, leg. S. SASAKI.

**Balanophora mutinoides** HAYATA sp. nov. (Tab. XXXI.) Herba circ. 10 cm. alta dioeca simplex. Volva campanulato-cupuliformis crustacea verrucosa. Scapi teretes 10 cm. longi 6-7 mm. in diametro glabri a basi usque ad medium squamosi, (squamis multis, inferioribus brevibus rotundatis, superioribus elongatis 4 cm. longis 1½ cm. latis), apice dense capitatim flores gerentes. Capitula ♂: conico-globosa 1½-2 cm. longa 1½ cm. lata. Receptaculum dense alteque foveolatum, in foveolam singulam florem unum gerens, bractea una sub flore singulo disposita lunuliformi peltata. Flores ♂ pedicellati, pedicellis 2 mm. longis. Perianthium 3-partitum, segmentis rotundato-triangularibus 2 mm. longis 3 mm. latis. Stamina 3 sessilia connata, antheris transversim sitis, oblongis 2 mm. longis 2-locellatis. Capitula ♀: conico-globosa 2 cm. longa, corporibus dense instructa, corporibus claviformibus 1 mm. longis apice

truncatis. Ovarium basi corporis dense congestum minutum fusiformi-filiforme cum stylo  $\frac{1}{2}$  mm. longum.

HAB. Arisan-Tozan, leg. S. SASAKI, Mart. 1911.

Somewhat allied to *B. involucrata* in the structure of the male flowers; but quite different in the absence of involucre.

## Euphorbiaceæ.

### *Sarcococca* LINDL.

***Sarcococca pruniformis*** LINDL. var. ***diœca*** HAYATA (Fig. 22) Ic. Pl. Formos. II. p. 130.

OBSERV. Frutex, ramis gracilibus fuscentibus minute pubescentibus vel subglabris teretibus. Folia alterna exsiccatò fusco-rubrescentia lanceolata pinnivena breve petiolata 8 cm. longa 2 cm. lata utrinque acuminata vel apice acuminata basi attenuata ad petiolum brevem  $1\frac{1}{2}$  cm. longum abeuntia coriacea margine integra recurvata, costis supra impressis vel elevatis, supra glabra subtus sub microscopio minute lepidota rubro-ferruginea vel pallidissima, venis primariis lateralibus utrinque inconspicuis primum rectis prope marginem abrupte flexuosis recurvis ascendentibus venam superiorem attingentibus. Flores ♀ spicato-racemosi, (racemis brevibus 1–2 cm. longis), cum pedicellis 9 mm. longi, (pedicellis 6 mm. longis), 1-bracteati, (bracteis lanceolatis), 8-bracteolati, bracteolis oppositis 4-seriatim imbricatisque dispositis obovatis breve cuspidatis in forma sepalum sub-æquantibus gradatim ad sepalum abeuntibus. Sepala 4 obovata breve obtuseque cuspidata 3 mm. longa  $1\frac{2}{3}$  mm. lata margine ciliolata. Ovarium 2-carpellare glabrum cum stigmatibus 3 mm. longum, stigma plus minus recurvatum. Fructus ignotus.

HAB. Montibus Centralibus, leg. U. MORI, Aprili., 1910.

Near *S. pruniformis* LINDL. (FORBES et HEMSLEY, Ind. Fl. Sin. II. p. 418 = *S. trinervia* WIGHT, Ic. t. 1877); but differs from the type by the much longer pedicels of the female flowers and by the lanceolate leaves.

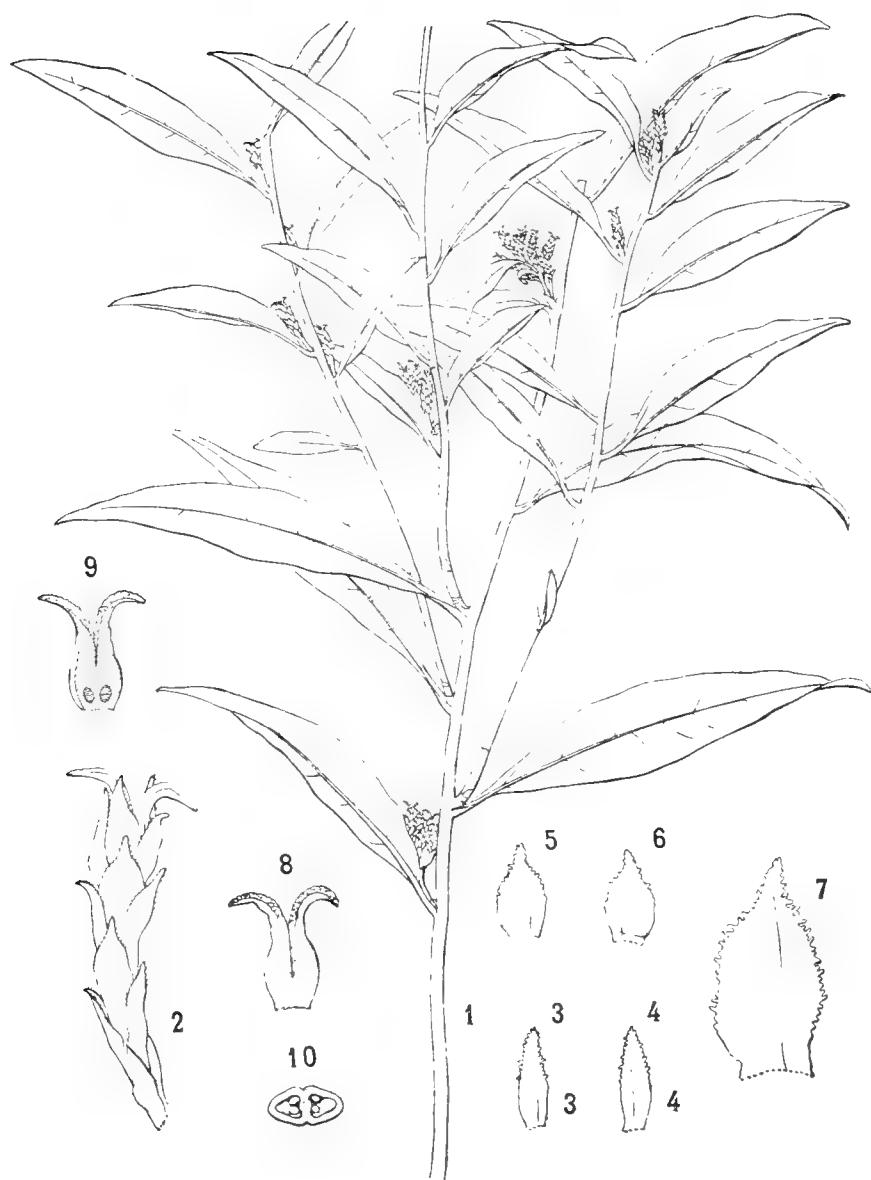


Fig. 22.

*Sarcococca pruniformis* LINDL. var. *dioeca* HAYATA. 1, a branch; 2, a flower; 3, 4, 5, 6, bracts, from outer to inner; 7, a sepal; 8, an ovary; 9, vertical section of the same; 10, cross section of the same. Fig. 1,  $\times \frac{1}{4}$ ; others are variously magnified.

*Pachysandra* MICH.

***Pachysandra axillaris* FRANCH. var. *tricarpa* HAYATA (Fig. 23) Ic.**  
Pl. Formos. p. 129.

OBSEV. Frutescens, 20–30 cm. alta; caulis simplex teres glaber sub lente brevissime pubescens sursum foliatus. Folia longe petiolata alterna ovato-oblonga vel elongato-oblonga 7–8 cm. longa  $3\frac{1}{2}$  cm. lata apice acuta abrupte acuminata vel caudata basi rotundata plus minus obliqua margine sursum paucè subdentata deorsum integra, dentibus brevibus, subtrinervia vel pinnivena subcoriacea vel membranaceo-coriacea utraque pagine subglabra sub lente minute pubescentia, venis utrinque prominentibus. Flores monœcii spicati, spicis axillaribus  $1\frac{1}{2}$  cm. longis dense floratis (floribus infimis uniceis ♀. reliquis ♂) breve pedunculatis, pedunculis 4 mm. longis. Fl. ♂: subsessiles 1-bracteati, bracteis subtriangularibus breve pubescentibus  $1\frac{1}{2}$  mm. longis. Perianthii segmenta 4, 2-seriatim oppositumque disposita oblonga  $3\frac{1}{2}$  mm. longa  $2\frac{1}{2}$  mm. lata apice rotundata basi contracta crassiuscula margine ciliata concava obscure 5-nervia subglabra. Stamina 4, segmentis perianthii opposita distincta  $6\frac{1}{2}$  mm. longa validiuscula erecto-patentia, filamentis complanatis  $4\frac{1}{2}$  mm. longis glabris  $\frac{1}{2}$  mm. latis, antheris 2 mm. longis  $\frac{1}{2}$  mm. latis adnatis obscure apiculatis. Rudimentum ovarii brevissimum quadrangulare  $\frac{2}{3}$  mm. latum. Fl. ♀: subsessiles 6 mm. longi 1-bracteati 4-bracteolati, bracteolis valde imbricatis. Perianthii segmenta 5, imbricata 3 mm. longa oblonga apice obtusa margine ciliolata. Carpella 3 basi connata extrorse recurvata, stigmatibus linearibus sub lente minute pubescentibus, ovulis 2 in carpellis singulis. Fructus ignoti.

HAB. Tonkarankei, leg. T. KAWAKAMI et U. MORI, Aprili, 1910.

Resembles the type in having axillary spikes, and three nearly distinct carpels; but differs from it by the acuminate or nearly caudate oblong leaves, much longer anthers and more recurved carpels.

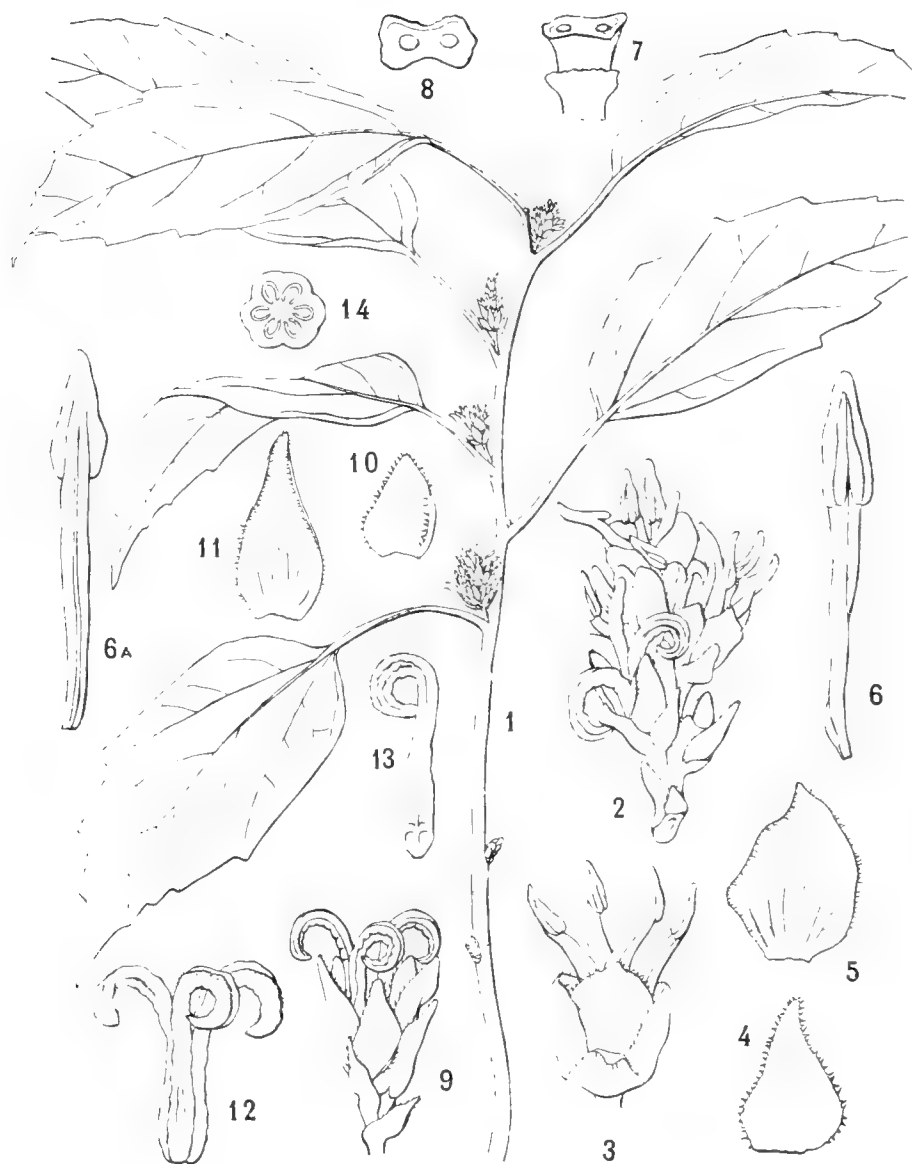


Fig. 23.

*Pachysandra axillaris* FRANCH. var. *tricarpa* HAYATA. 1, the plant; 2, a raceme; 3, a male flower; 4, a bract of the same; 5, a sepal of the same; 6, 6A, a stamen, seen from different sides; 7, rudimentary ovary of the same; 8, the same seen from above; 9, a female flower; 10, a bract of the same; 11, a sepal of the same; 12, a pistil; 13, a carpel; 14, cross section of an ovary. Fig. 1,  $\times \frac{2}{3}$ ; others are variously magnified.

*Macaranga* THOUARS.**Macaranga dipterocarpifolia** MERRILL.

HAB. Kashōtō, leg. G. NAKAHARA, Feb. 1906 (No. 1042); Kōtōshō, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912 (No. 30).

Compared with a specimen from the Philippines.

*Excœcaria* LINN.**Excœcaria formosana** HAYATA n. n.

*Excœcaria crenulata* WIGHT var. *formosana* HAYATA Mater. Fl. Formos. p. 271 (1911).

*Excœcaria orientalis* PAX et K. HOFFM. in Pfl.-reich, Euphorb.-Gelon. p. 160 (1912).

*Excœcaria crenulata* HAYATA in Journ. Coll. Sc. Tōkyō XX. p. 60.

**Excœcaria Kawakamii** HAYATA n. n. = *Excœcaria formosana* HAYATA et KAWAKAMI n. sp. in Sched. (non HAYATA). Frutex? Rami apice dense foliati. Folia alterna coriacea obovato-lanceolata vel obovato-elliptica 11½ cm. longa 3 cm. lata apice obtusa deorsum gradatim cuneatimque angustata ad extremitatem subito attenuata ad petiolum attenuata margine integerrima desuper revoluto-recurvata utraque pagine glaberrima, costa supra tenuiter subtus prominente elevata, venis primariis utraque pagine tenuiter elevatis subtransversis rectis vel irregulariter subramosis, supra nitida subtus pallidiora, petiolis 1½ cm. longis complanatis. Spicæ ad apicem ramorum fasciculatæ filiformes erectæ 10 cm. longæ unisexuales vel bisexuales generaliter sursum fl. ♂, deorsum fl. ♀ gerentes. Fl. ♂: basi 1-bracteati, bracteis late rotundatis 1½ mm. latis 1½ mm. longis apice breve cuspidatis crassiusculis margine erosis basi glandula 2 instructis, pedicellis ½ mm. longis incrassatis glabris. Sepala 3 oblongo-triangularia 1½ mm. longa margine pauce denticulata apice attenuato-cuspidata. Stamina 3, filamentis a basi divaricatis ± continuis 1 mm. longis glabris, antheris reniformibus 1 mm. latis ½ mm. longis apice breve apiculatis. Fl. ♀: basi 1-bracteati, bracteis latissimis 1½ mm. latis ¼ mm. longis apice medio mucronatis, pedicellis 1 mm. longis incrassatis.

Sepala cordato-rotundata  $1\frac{1}{2}$  mm. longa totiusque lata apice triangulari-acuta mucronata paucè denticulata vel mucronibus ciliiformibus 1-2 utroque latere margine instructa basi utroque latere glandulis instructa. Ovarium obovoideum  $1\frac{1}{2}$  mm. longum apice ad stylum crassum abeuns, stylo 3-fido, segmentis incrassatis patentibus recurvatis.

HAB. Kwashôtô, leg. G. NAKAHARA, Feb. 1906, Typus! (No. 948).  
Kôtôshô, leg. U. MORI (No. 2476).

Near *Excecaria philippinensis* MERRELL., but differs from it by the quite obtuse leaves.

## Urticaceæ.

### *Ulmus* LINN.

***Ulmus Uyematsui*** HAYATA sp. nov. (Tab. XXXII.) Arbor? Folia elliptica vel oblonga  $\pm$  obliqua 10 cm. longa  $4\frac{1}{2}$  cm. lata apice cuspidata, (cuspidibus  $1\frac{1}{2}$  cm. longis acuminatis), basi oblique obtusa ad extremitatem  $\pm$  cordata chartacea supra parcissime subtus densiuscule pubescentia margine tenuiter duplicato-serrulata, costis venisque supra tenuiter impressis subtus distincte elevatis, venis rectis mediis angulo  $40^\circ$  a costa egressis simplicibus vel prope apicem furcatis, ad axillas inter costam et venas dense pubescentia, venulis secundariis inconspicuis inter venas primarias transverse minuteque reticulatis, petiolis brevissimis 4 mm. longis. Racemi axillares breves 1 cm. longi dense florati, rhachidibus pedicellisque breve dense pubescentibus, pedicellis ternatim fasciculatis, sub fasciculis singulis bractea una instructis, bracteis oblongis 5-6 mm. longis scariosis sursum ciliolatis cæterum glabris, pedicellis 6 mm. longis ad medium articulatis. Calyx campanulatus 3 mm. longus apice totiusque latus sursum 5-6 lobatus, lobis obovato-rotundatis 1 mm. longis totiusque latis apice rotundatis margine ciliatis cæterum glabris. Fructus compressus siccus oblique obovatus ala undique cinctus, cum alis 1 cm. longus totiusque latus, alis latis membranaceis radiatim reticulato-venosis a basi stipitis usque ad apicem ramorum styli extensis, stipitibus 2 mm. longis; pericarpio chartaceo. Semen sub apice affixum pendulum plano-com-



pressum; albumen 0; embryo rectus, cotyledonibus planis æqualibus, radícula parva supra.

HAB. Mt. Arisan, leg. K. UYEMATSU, Mart. 1913.

Near *U. castaneifolia* HEMSLEY; but differs from that by the much thinner leaves without any particular beards on the axils of the primary lateral veins.

*Elatostema* FORST.

**Elatostema edule** C. B. ROBINSON, in Philip. Journ. Sci. (1910) p. 531.

HAB. Kōtōshō.

DISTRIB. Batanes islands.

*Leucosyke* ZOLL. MOR.

**Leucosyke quadrinervia** C. B. ROBINSON in Philip. Journ. Scie. (1911) p. 29.

Determined by Mr. T. KAWAKAMI at Manila in his trip to the Philippines.

Cupuliferæ.

*Carpinus* LINN.

**Carpinus Kawakamii** HAYATA (Tab. XXXIII.-B, et Fig. 24.) Rami in exsiccato fusco-purpurascens lenticellis minutis notati. Alabastrum foliorum oblongo-ovoideum  $\pm$  4-angulatum, perulis plurimis, extimis minimis, medioeribus ovato-oblongis castaneis 4 mm. longis  $2\frac{1}{2}$  mm. latis obtusis ovatis concavis, intimis  $\pm$  minoribus. Folia oblonga vel lanceolato-ovata apice acuminata basi obtusa vel leviter obtuso-cordata usque ad 7 cm. longa  $2\frac{1}{2}$  cm. lata margine supra basin usque ad apicem duplicato-serrata sed ad basin non serrata, venis lateralibus primariis utroque latere 10-12 rectis prope apicem serrarum ascendente-recurvis ad apicem serrarum primariarum attingentibus, supra distincte subtus obscure reticulata, costis et venis supra non elevatis barbis longiusculis parce pubescentibus, subtus prominentibus barbis longiusculis parce oblectis, utraque pagine (exceptis costis venisque) glabra, venis primariis lateralibus a costa angulo  $40^\circ$  divaricatis, chartacea, petiolis circ. 9 mm. longis supra longe adpresso-barbatis subtus glabris.

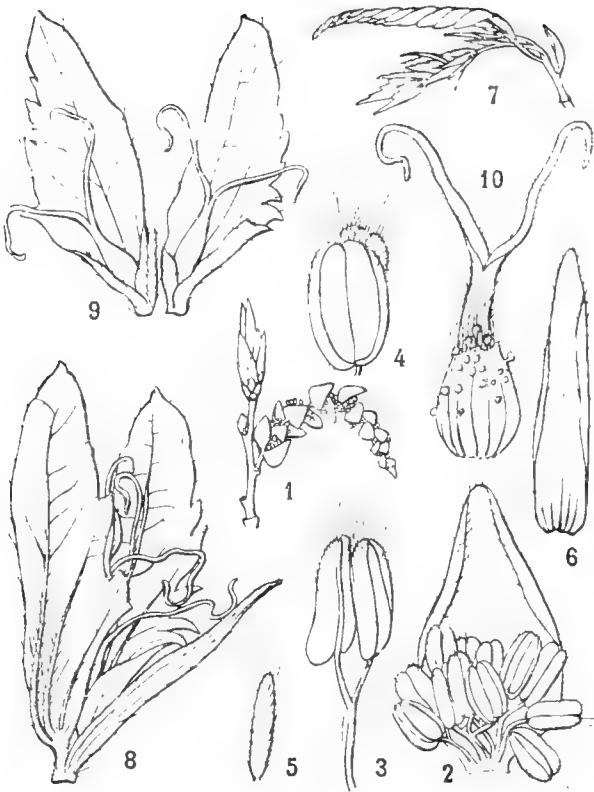


Fig. 24.

*Carpinus Kawakamii* HAYATA. 1, male inflorescence; 2, a male flower; 3, 4, stamens; 5, a single stamen; 6, a pistil; 7, a female inflorescence; 8, a pair of female flowers; 9, the same, expanded; 10, a female flower, bracts taken off. Fig. 1, and 7 natural size; others are more or less magnified.

Spicæ laxifloræ, fructiferæ 4 cm. longæ, fructibus laxissime dispositis, bracteis semi-ovatis 18 mm. longis 7 mm. latis valde obliquis, (dimidio  $1\frac{1}{2}$  mm. lato latere integro, dimidio 5 mm. lato, venis primariis lateralibus 3), venulis utraque pagine prominente reticulatis, extus ad costas et venas pilis longis dense, intus parcissime pubescentibus, basi non lobatis concavis fructus foventibus. Fructus complanato-ovatus 4 mm. longus 3 mm. latus apice obtuso-apiculatus basi rotundatus utraque facie 3-striato-costatus apicem versus verrucoso-resinoso-punctatus apicem versus pubescens.

HAB. Monte Morrison, Oct. 1907, (No. 1998.)

Near *C. faginea* LINDL.; but differs from it by the duplicately serrate leaves.

**Carpinus minutiserrata** HAYATA sp. nov. (Tab. XXXIII.-A.) Rami et ramuli in exsiccato fusco-purpurascens vel huc atque illuc cinerascens, lenticellis minutis rotundatis notati. Folia oblongo-ovata apice acuminata sed ad summum obtusa basi obtusa leviter cordata usque ad 6 cm. longa  $2\frac{1}{2}$  cm. lata margine supra basin usque ad apicem tenuiter vel tenuissime duplicato-serrulata, venis lateralibus primariis 15-17 angulo  $40^\circ$  a costa divaricatis rectis versus apicem ascendendo-recurvis ad apicem serrarum primariarum attingentibus, supra ad costas barbis longiusculis parce adpresseque oblecta cæterum glabra, venis secundariis elegante elevato-reticulatis, costis et venis non elevatis, subtus ad costas et venas primarias prominentes barbis longiusculis parce oblecta cæterum glabra, venis secundariis elevato-reticulatis, petiolis 7 mm. longis teretibus subglabris vel parce pubescentibus. Racemi fructiferi 3-4 cm. longi subdescendentes laxè fructiferi, fructibus ad nodos geminis, geminis alternis 4 mm. a se remotis, partibus inferioribus non fructiferis  $1\frac{1}{2}$  cm. longis rhachidibus tenuissime pubescentibus, bracteis semi-angulato-ovatis valde obliquis 13 mm. longis 6-7 mm. latis basi auriculato-decurrentibus pedicellum per partes amplexans et fructus foventibus utraque elevato-reticulatis intus ad nervos parcesime hirsutis cæterum glabris, extus ad nervos et ad partem auriculatam dense hirsutis cæterum glabris, semi-angulato-ovatis valde obliquis, dimidio 5 mm. lato subduplicato-serrato, (serris  $1\frac{1}{2}$  mm. latis  $\frac{1}{2}$  mm. longis apice leviter callosis) a basi nervos 3 emittenti, dimidio  $1\frac{1}{2}$  mm. lato serris 1 vel 2 margine instructo, ad nervos minute parceque resinoso-punctatis. Achænium globoso-ovatum 3 mm. longum  $2\frac{2}{3}$  mm. latum complanatum utraque facie 5-costatum superiore resinoso-verrucoso-punctatum apice parce pubescens apiculatum interdum stylis duobus persistentibus coronatum, inferiore glabrum.

HAB. Tandaiha, leg. U. MORI, Aprili. 1910.

Closely allied to *C. Seemeniana* DIELS; but differs from that by the thinner and smaller leaves with smaller serration, and the smaller bracts with auriculate decurrent base.

*Corylus* LINN.*Corylus rostrata* AIT. var.?

HAB. Formosa: loco non indicato.

Near *C. rostrata* AIT. var. *Sieboldiana* Mx. but differs from it by the much shallower dentation of the leaves. Neither fruit nor flower, exact identification is impossible.

*Quercus* LINN.*Quercus arisanensis* HAYATA

sp. nov. *Pasania arisanensis* HAYATA in Herb. Taihoku. Folia tenuiter coriacea oblonga usque ad 10 cm. longa 4 cm. lata apice breve cuspidato-acuta ad summum obtusa basi acuta ad extremitatem angustissime attenuata ad petiolum subalatum abeuntia utraque glabra subtus opaca supra nitida, costis et venis supra tenuiter subtus distincte elevatis, venis lateralibus primariis tenuissimis utroque latere costæ 10–12, venis mediocribus basi a costa angulo 60° egressis arcuatis, venis secundariis reticulatis margine integerrima, petiolis 2 cm. longis subcomplanatis apice subalatis basi incrassatis. Spicæ fructiferæ 7 cm. longæ validiusculæ, fructibus aggregatim spicatum dispositis. Cupula patelliformis 7 mm. alta 17 mm. in diametro, lepidibus multi-seriatim dispositis, mediocribus late triangulari-

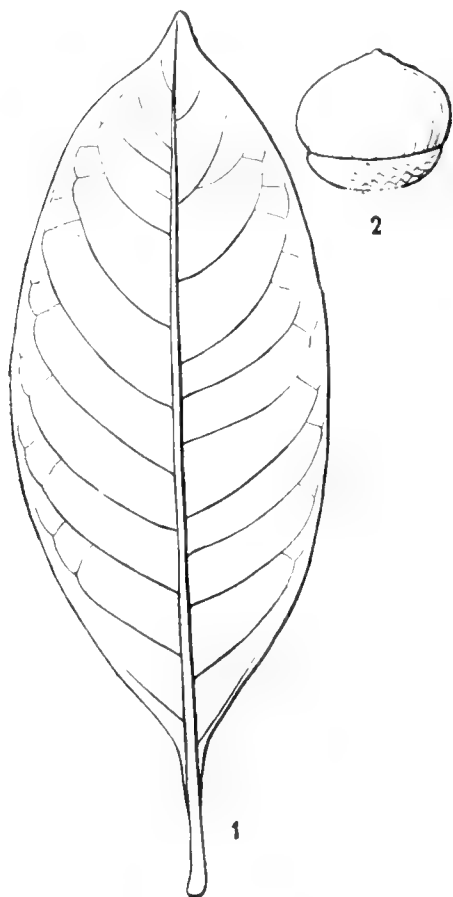


Fig. 25.

*Quercus arisanensis* HAYATA. 1, a leaf; 2, a fruit. Natural size.

bus apice cuspidatis 2 mm. latis extus leviter adpresse tomentosa intus tenuiter adpresse pubescens, cicatricibus glandum 8 mm. in diametro elevatis. Glans valde depresso-globosa 12 mm. longa 20 mm. in diametro, cicatibus valde impressis 8 mm. in diametro.

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan. 1912.

Near *Q. brevicaudata*, but differs from it by the shortly acute less coriaceous leaves with reticulated second veins.

**Quercus** (*Cyclobalanopsis*) **Blakei** SKAN, in HOOK. Ic. Pl. t. 2662.

HAB. Hainan, leg. N. KONISHI, Juni. 1909.

DISTRIB. China: New British territory on the mainland opposite Hongkong.

**Quercus castanopsisifolia** HAYATA sp. nov. (Fig. 26). *Pasania castanopsisifolia* HAYATA in sched. Herb. Taihoku. Rami novelli fuscentes glaucescentes. Folia lanceolato-oblonga vel elongato-oblonga 25 cm. longa 7-8 cm. lata apice caudato-acuminata vel acuminata basi cuneata margine repanda chartacea utraque opaca, subtus pallidissima vel cinerascens, venis lateralibus primariis 13-15 angulo 60°-50° a costa egressis, supra costis et venis planis non elevatis subtus prominente elevatis, subtus pagine tenuissime minuteque lepidota, petiolis brevioribus 1-2 cm. longis. Fructus spicati. Involucrum fructiferum truncato-globosum solitarium vel 2-3-connatum subglobosum longius quam latius 3½ cm. longum 3 cm. latum vel latius glandem perfecte includens apice truncatum depresso-foveolatum basi rotundatum intus glabrum extus bracteis accrescentibus spiraler dense imbricatum instructum, bracteis tuberculiformibus adnatis subtriangularibus ± apiculatis. Glans globosa truncata truncato-depressa ad centrum apiculata, involucreo perfecte inclusa.

HAB. Arisan, leg. T. UYEMATSU, Sept. 1912.

Near *Q. lepidocarpa* HAYATA, but differs from it by the much longer oblongo-lanceolate leaves which are much thinner and minutely lepidote.

**Quercus Cornea** LOUR. (FORBES et HEMSLEY, Ind. Fl. Sin. II. p. 510), var. **Konishii** HAYATA n. v. *Pasania Cornea* LOUR. var. *Konishii* HAYATA (Herb.

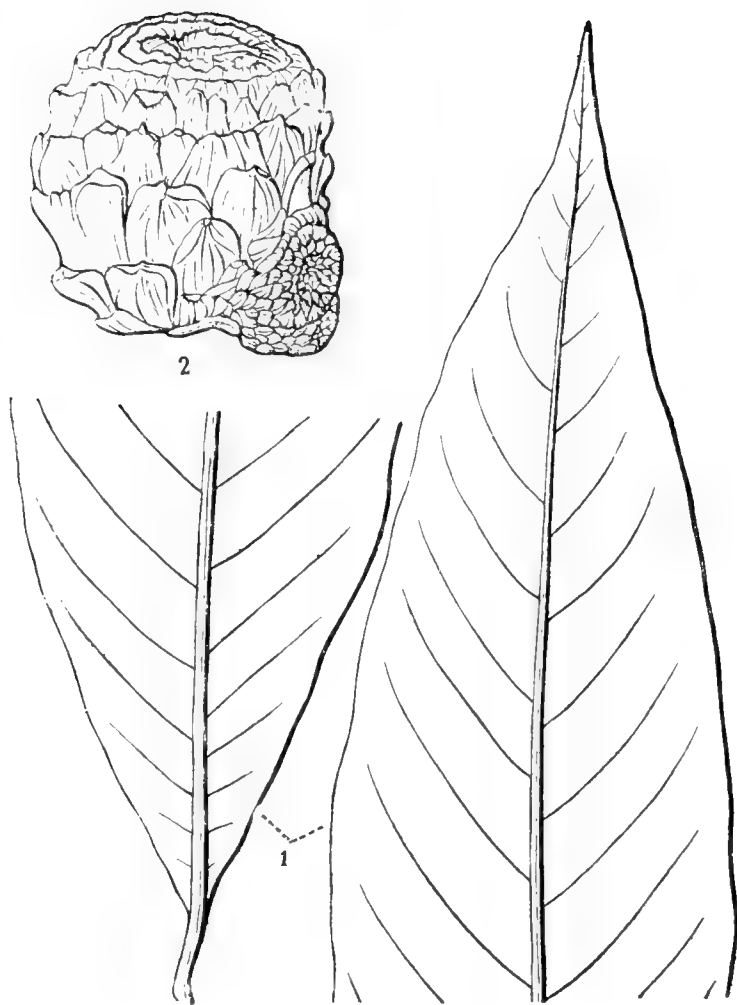


Fig. 26.

*Quercus castanopsisifolia* HAYATA. 1, a leaf; 2, a fruit. Natural size.

Taihoku). Rami et ramuli recti  $\pm$  hirsuti lenticellis minutis notati, cortice longitudinaliter fissio soluto. Folia obovato-oblonga vel obovato-ob lanceolata apice cuspidato-caudata ad summum obtusa basi obtusa vel cuneata usque ad 20 cm. longa 7 cm. lata superiore latissima utraque pagine glabra, costis et venis supra impressis subtus prominente elevatis, supra ad costas leviter hirsuta subtus parce hirsuta ad axillas venarum hirsuta, venis lateralibus primariis

utroque latere costæ 15-16  $\pm$  arcuatis, chartacea, petiolis usque ad 3 cm. longis ad basin incrassatis, stipulis caducissimis 6 mm. longis lanceolatis. Spicæ fructiferæ in speciminibus nostris erectæ 10 cm. longæ, ad nodos flores 3-natim vel 4-natim gerentes sed abortu ad nodos fructus unum gerentes. Cupula cupuliformis 17 mm. alta 2½ cm. in diametro depresso-dense-hirsuta, lepidibus cuspidatis multi-seriatim instructis, lepidibus inferioribus majoribus superioribus minoribus. Glans hemisphærica apice truncata leviter convexa brevissime tomentosa ad centrum apiculata, apice libera, cæterum cupula inclusa.

HAB. Hainan, leg. N. KONISHI, 1909, Juni. (Fr. et Fl.).



Fig. 27.

*Quercus dodoniæfolia* HAYATA.  
1, a leaf; 2, a fruit. Natural size.

I conjects that this is the same as a plant mentioned by Mr. SKAN in the above referred work as "Hainan (B. C. HENRY, 65!)." As is shown by the same author the Hainan specimen differs from the type in having broader and thinner leaves. It may be regarded as a variety of the same.

DISTRIB. Type: Tonquin, Cochinchina, Borneo and Java.

***Quercus dodoniæfolia* HAYATA sp. nov.**

(Fig. 27). *Pasania dodoniæfolia* HAYATA Herb. Taihoku. Rami recti, cortice cinerascenti longitudinaliter fissis non lenticellatis parvis strigilloso, pilis horizontaliter patentibus. Folia valde coriacea lineari-lanceolata vel oblongo-lanceolata 8-10 cm. longa 1½-2 cm. lata apice obtusa basi cuneato-attenuata supra nitida subtus pallidissima margine integerrima  $\pm$  recurvata, supra costa  $\pm$  impressa subtus elevata, venis lateralibus  $\pm$  impressis, subtus gracillimis, petiolis 11 mm. longis subulatis supra planis a basi  $\pm$  incrassatis. Cupula sessilis subplana 15 mm. in diametro extus adpresse tenuiter tomentosa (squamis latissimis apice latis truncatis ad centrum apici breve

cuspidatis multiseriatis) intus sericeo-pubescens, cicatricibus valde elevatis, 8 mm. in diametro. Glans depresso-globosa valde depressa  $1\frac{1}{2}$  cm. in diametro 1 cm. longa apice ad centrum  $\pm$  mucronata.

HAB. Shinsuiye, leg. S. NAKAI, Dec. 7, 1912.

Near *Q. Naiadarum* HANCE; but differs from it by the shape of the cup and glans.

**Quercus hypophæa** HAYATA sp. nov. (Fig. 28); *Pasania hypophæa* HAYATA in Schid. Herb. Taihoku. Ramuli rugosi lenticellis minutis notati

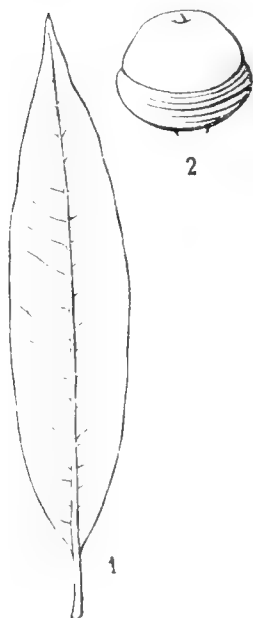


Fig. 28.

*Quercus hypophæa* HAYATA. 1, a leaf; 2, a fruit. Natural size.

superiore tenuiter depresso-tomentella. Folia coriacea oblongo-lanceolata vel ovato-lanceolata 7-8 cm. longa 20-25 mm. lata apice acuminata basi obtusa supra glabra nitida subtus dense adpresseque fulvo-tomentella margine subintegra, costis supra tenuiter impressis subtus elevatis, venis lateralibus tenuissimis non conspicuis utrinque subplanis vel subtus leviter elevatis, petiolis  $1\frac{1}{2}$  cm. longis dense adpresse tomentellis intus sulcatis basi non incrassatis. Cupula late patelliformis ad orem leviter contracta 16 mm. in diametro 6 mm. alta, extus adpresse denseque pubescens, (annulis 9 basi 2 mm. a se remotis, superiore proximatis  $\frac{1}{2}$  mm. a se remotis), intus fulvo-sericeo-pubescens, cicatricibus planis. Glans depresso-ovoidea 13 mm. longa 12 mm. lata apice depressa ad centrum apiculata basi rotundata, (cicatricibus elevatis 7 mm. in diametro), supra cicatrices subito contracta, facie sericeo-pubescens castanea.

HAB. Shinsuiye, Dec. 8, 1912, leg. S. NAKAI.

**Quercus longicaudata** HAYATA sp. nov. (Fig. 29); *Pasania longicaudata* HAYATA in Schid. Herb. Taihoku. Rami rugosi lenticellis minutis notati. Folia lanceolata coriacea 9 cm. longa  $1\frac{1}{2}$  cm. lata apice lineari-attenuata vel



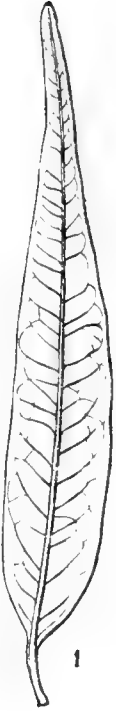


Fig. 29.

*Quercus longicaudata* HAYATA.  
1, a leaf. Natural size.

longissime caudata basi obtusa margine subintegra apice  $\pm$  falcata vel recta margine  $\pm$  recurva, costis supra tenuiter impressis subtus prominentibus, venis lateralibus primariis tenuissimis supra non visis subtus tenuissime elevatis, supra glabra subtus adpresse lepidota. Spicæ  $\varnothing$  axillares erectæ 5 cm. longæ. Fructus non visi.

HAB. Mt. Daibu, leg. S. NAKAI, Dec. 21, 1912.

Near *Q. cuspidata*, but differs from it in having subentire lanceolate leaves with long linear tails.

**Quercus** (*Pasania*) **Naiadarum** HANCE in Journ. Bot. (1884) p. 227.

HAB. Hainan, leg. N. KONISHI, Juni. 1909.

The specimen lacks fruits. As far as is concerned the flowering specimen, our plant is perhaps identical with the named species.

**Quercus Nariakii** HAYATA sp. nov. (Fig. 30); *Pasania Nariakii* HAYATA in Schid. Herb. Taihoku. Rami et ramuli brevissime tomentosi lenticellis notati. Folia chartaceo-coriacea vel coriacea obovato-oblonga usque 15 cm. longa 5 cm. lata apice breve cuspidato-caudata ad summum obtusa basi acuta cuneata margine integra utraque pagine glabra subtus glaucescentia, costis et venis supra subplanis subtus prominentibus, venis lateralibus primariis tenuibus utroque latere costæ 15-12, iis medioeribus a costa angulo 45° egressis, petiolis brevissimis incrassatis 7 mm. longis subtus rugosis. Spicæ foemineæ pauci-ramosæ vel simplices quasi-terminales 7-8 cm. longæ, rhachidibus validis fusco-tomentosis, floribus 5-6-aggregatis, bracteis multi-seriatis obtectis. Fructus ad rhachin valde incrassatam validissimam aggregatim spicatim dispositi. Cupula sessilis turbinata 13 mm. longa 15 mm. lata (ore subclauso 1 cm. in diametro), glandem semi-includens, lepidibus valde adpressis late rhomboideis apice breve cuspidatis, cuspidibus liberis, lepidibus in magnitudine mutabilibus, inferioribus majoribus 4-5 mm.

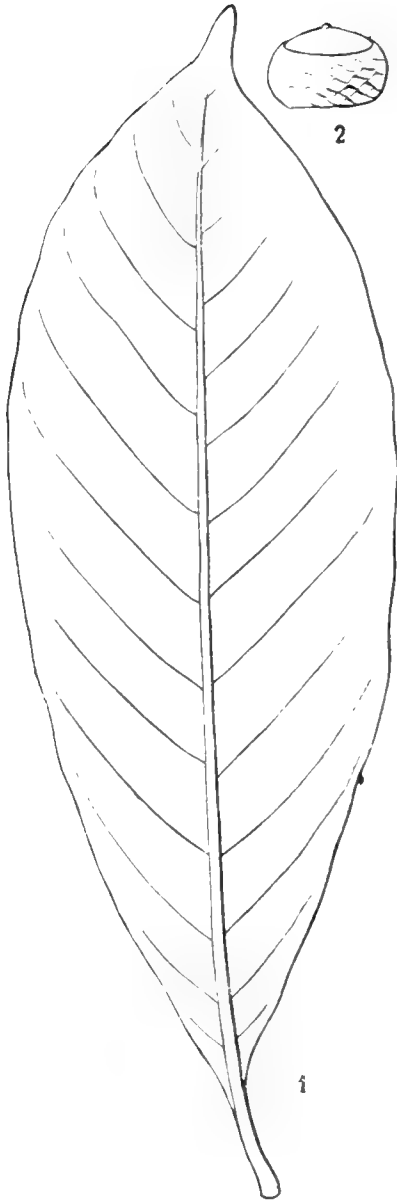


Fig. 30.

*Quercus Nariakii* HAYATA. 1, a leaf; 2, a fruit. Natural size.

latis, mediocribus 4 mm. latis, superioribus minoribus  $1\frac{1}{2}$  mm. latis. Glans (præmatura?) depresso-hemisphærica 12 mm. lata 7 mm. longa castaneoglabra.

HAB. Hainan, leg. N. KONISHI, Juni. 1909.

Near *Quercus spicata*. Owing to the lack of a mature cone, the exact comparison is not possible.

***Quercus subreticulata* HAYATA** sp. nov. (Fig. 31); *Pasania subreticulata* HAYATA in Schid. Herb. Taihoku. Rami fusco-cinerascentes

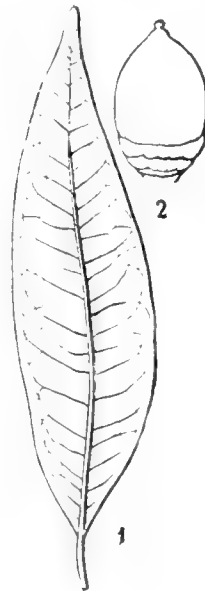


Fig. 31.

*Quercus subreticulata* HAYATA. 1, a leaf; 2, a fruit. Natural size.

glabri lenticellis globosis minutis notati, subrugosi. Folia lanceolata vel oblongo-lanceolata 8 cm. longa 23–25 mm. lata apice attenuato-obtusa vel obtusa basi obtusa vel acuta integra coriacea  $\pm$  recurvato-plicata supra nitida utraque pagine glabra, costis supra planis subtus elevatis, venis lateralibus tenuibus, utraque pagine minute et distincte reticulata, petiolis 7 mm. longis intus planis subalatis basi  $\pm$  incrassatis nigricantibus. Spicæ fructiferæ erectæ, fructibus ad nodos fasciculatis maturo geminatis vel solitariis basi fructi-

bus abortivis instructis. Cupula sessilis late obconico-patelliformis 4–5 mm. alta 1 cm. in diametro extus tenuiter adpresse tomentosa, (lepidibus connatis annulariter dispositis, annulis remote late dentatis, annulis inferioribus 1–2 mm. a se remotis, superioribus proximatis dispositis), intus sericeo-pubescentis, cicatricibus elevatis. Glaus ovoidea apice obtusa apiculata basi rotundata 18 mm. longa 12 mm. lata, cicatricibus minoribus 4 mm. in diametro alte impressis, facie nitida fulva.

HAB. Shinsuiye, leg. S. NAKAI, Dec. 1912.

**Quercus taichuensis** HAYATA (Fig. 32) Mater. Fl. Formos. p. 196.

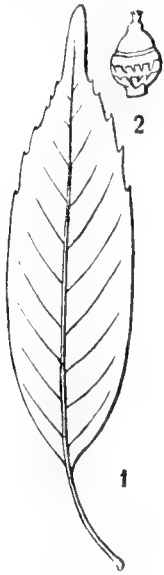


Fig. 32.

*Quercus taichuensis*  
HAYATA. 1, a leaf; 2, a  
fruit. Natural size.

**Quercus tomentosicupula** HAYATA sp. nov. (Fig. 33); = *Cyclobalanopsis tomentosicupula* HAYATA in Schid. Herb. Taihoku. Rami validiusculi, exsiccati fuscentes, lenticellis minutis notati rugosi. Folia valde coriacea oblongo-lanceolata 9–10 cm. longa 3 cm. lata apice breve acuminata ad summum obtusa basi acuta

in exsiccato utraque pagine opaca subtus pallido-glaucescentia margine medio sursum remote paucè serrata, (serris brevissimis a se 12 mm. remotis), costis et venis supra planis subtus prominentibus, venis lateralibus primariis tenuissimis utroque latere costæ 8–9 mediocribus a costa angulo 45° egressis subrectis vel leviter arcuatis apice ad apicem serræ attingentibus, subtus pagine ad costas parçissime hirsuta, petiolis 1½ cm. longis semi-teretibus leviter tomentosis vel subglabris. Cupula sessilis late campanulata ore expansa 13 mm.

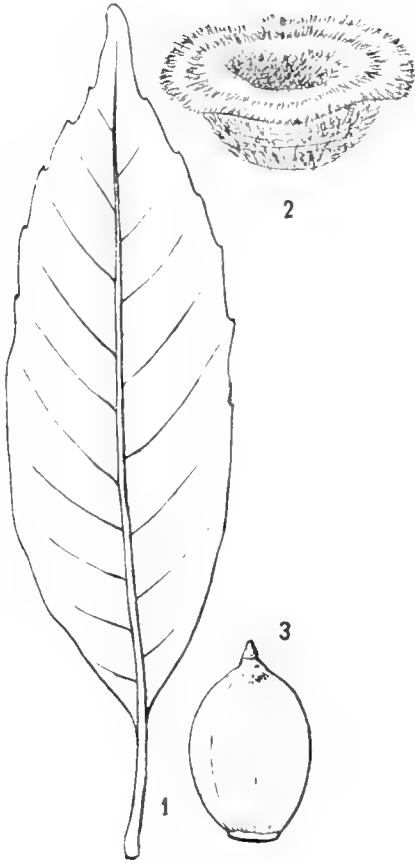


Fig. 33.

*Quercus tomentoscupula* HAYATA. 1, a leaf; 2, a cupula; 3, a glans. Natural size.

alta  $2\frac{1}{2}$ –3 cm. in diametro basi rotundata intraque pagine dense fulvo-tomentosa, (pilis longis), extus 9–10 annulis concentricis instructa, annulis inferioribus obtuse dentatis, superioribus integris. Glans ellipsoidea  $2\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  cm. lata apice acuto-apiculata basi rotundata, cicatricibus minoribus 7 mm. in diametro, apice breve tomentosa cæterum glabra.

HAB. Formosa: Loco non indicato, leg. S. NAKAI.

Near *Q. Edithæ* SKAN (HOOK. Ic. Pl. t. 2661), but differs from it by the much smaller acorns with broad campanulate cups. Also near *Q. pachyloma* SEEM. from which our new plant is distinguishable by the glabrous leaves and much larger cups.

***Quercus rhombocarpa* HAYATA** sp. nov. (Fig. 34); *Pasania rhombocarpa* HAYATA in Schid. Herb. Taihoku. Rami et ramuli recti in exsiccato atro-purpurascens glabri, lenticellis minutissimis, longitudinaliter rugosi.

Folia coriacea utraque opaca subtus glauco-cinerascentia ovato-oblonga 8–10 cm. longa 26 mm. lata apice acuminata ad summum obtusa, (acuminibus  $\pm$  falcatis vel rectis), basi acuta ad basin subito attenuata, costis et venis supra planis subtus distincte elevatis, venis lateralibus primariis utroque latere costæ 7–8–9 mediocribus a costa angulo  $40^\circ$  egressis, venis secundariis non conspicuis, petiolis 2 cm. longis semi-teretibus basi  $\pm$  incrassatis. Fructus ad spicam valde incrassatam aggregatim dispositi. Cupula

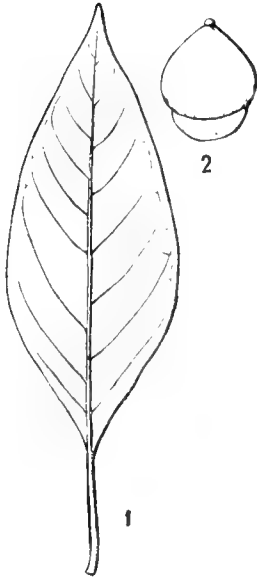


Fig. 34.

*Quercus rhombocarpa* HAYATA.  
1, a leaf; 2, a fruit. Natural  
size.

patelliformis vel cupuliformis 8 mm. in diametro 5 mm. alta intus pubescens, lepidibus triangularibus adpressis apice  $\pm$  breve cuspidatis, medio cribus 1 mm. latis, cicatricibus glandum elevatis 4–5 mm. in diametro. Glans glabra  $\pm$  depresso globoso-turbinata apice 13 mm. in diametro 12 mm. longa apice acuto-apiculata basi truncata, cicatricibus minoribus 5 mm. in diametro valde impressis.

HAB. Akō: Buisan, leg. T. KAWAKAMI et S. SASAKI, 1910, Mart.

Near *Q. taiitensis* HAYATA, but differs from that by the turbinate glans, and by the shape of the cup.

**Quercus uraiana** HAYATA Mater. Fl. Formos. p. 299 *Pasania uraiana* HAYATA in Schid. Herb. Taihoku. Descriptio auctata. Amenta  $\varphi$  et  $\sigma$  versus apicem ramulorum paniculatim mixtim dispositi, amentis  $\sigma$  inferioribus patentibus  $\pm$  recurvato-descendentibus 3 cm. longis, amentis  $\varphi$  superioribus 3 cm. longis patentibus recurvato-descendentibus, bracteis singulis sub amento utrique sexus sitis, bracteis caducissimis semi-amplexicaulibus  $4\frac{1}{2}$  mm. longis  $4\frac{1}{2}$  mm. latis apice obtusis margine denso barbato-ciliatis, rhachidibus  $\pm$  tomentosis, floribus singulis bractea una bracteolis duobus instructis, bracteis 1 mm. latis latioribus quam longioribus margine laciniatis, bracteolis minoribus bractea conformibus. Fl.  $\sigma$ : non aggregati, segmentis perianthii late oblongis  $1\frac{1}{2}$  mm. longis extus glabris margine barbato-ciliatis intus dense barbatis. Stamina circ. 10, filamentis glabris, antheris cordatis vix apiculatis. Rudimentum ovarii dense barbatum. Fl.  $\varphi$ : non aggregati stigmatibus digitiformibus.

HAB. In Uraisha: Shinkō, leg. U. MORI, 1908, Feb. (No. 5081.)

*Castanopsis* SPACH.

***Castanopsis brachyacantha*** HAYATA sp. nov. Ramuli in exsiccato glabri fusco-cinerascentes, lenticellis minutis notati. Folia coriacea in exsiccato pallido-fulvescentia utraque glabra ovato-lanceolata usque ad 7 cm. longa  $2\frac{1}{2}$  cm. lata apice acuminata ad summum obtusa  $\pm$  falcata vel recta, basi obliqua basi latere angustiore acuta, latere latiore rotundata, margine integra vel medio sursum obscure remoteque serrata, serris brevissimis a se

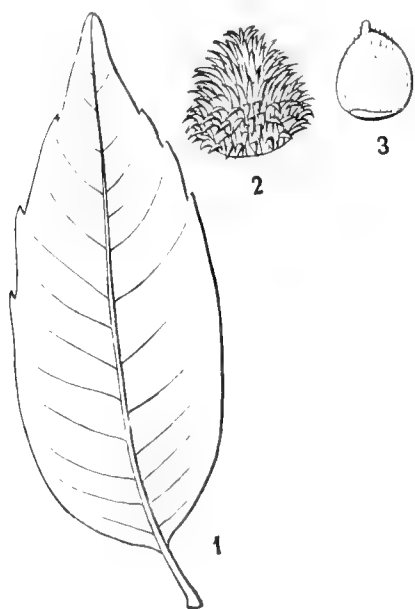


Fig. 35.

*Castanopsis brachyacantha* HAYATA. 1, a leaf; 2, a fruit; 3, a glans. Natural size.

12 mm. remotis, costis et venis supra planis subtus tenuiter elevatis, venis lateralibus tenuissimis utroque latere costae 9-8 prope marginem evanescentibus, supra nitida infra non opaca, petiolis brevioribus 6-7 mm. longis complanatis. Alabastrum foliorum oblongum apice obtusum complanatum, perulis pluriis obtectum, perulis 2-seriatim imbricatum dispositis in formi variabilibus apice barbatis margine ciliolatis facie glabris. Fructus spicati sessiles. Involucrum fructiferum spinosum ovoideo-conicum cum spinis 13 mm. longum totiusque latum extus adpresse pubescens spinis simplicibus densiuscule obtectum, (spinis recto-falcatis acutis 3 mm. longis), intus adpresse sericeo-pubescens. Glans solitaria globoso-pyramidalis 1 cm. longa totiusque lata, facie tenuissime adpresse pubescens, basi truncata, apice acuto-apiculata.

HAB. Nantōchō: Mt. Shojōdaisan, ad 6000 ped. alt., leg. S. KATŌ, 1910, Dec. (Fructus).

**Castanopsis formosana** HAYATA sp. nov. Rami et ramuli atro-rubro-purpurascens hinc at illuc cinerascens, lenticellis-rotundatis elevatis minutis notati. Folia tenuiter coriacea ovato-oblonga 8-9 cm. longa 3-3½ cm. lata apice acuminata basi acuta vel late cuneata supra basin usque ad apicem valde dentata, (dentibus in utroque latere 6-7, 1½-1¾ cm. a se remotis apice leviter incurvis acutis, sinibus inter dentes rotundato-obtusis), supra glabra subtus cinereo-glauescentia, costis et venis supra planis subtus distincte elevatis, venis primariis lateralibus utroque latere costæ 7-8, a costa angulo 45° egressis apice ad apicem dentum attingentibus tenuibus, petiolis glabris 13 mm. longis basi ± incrassatis. Spicæ florum ♂: ad apicem ramulorum terminales vel versus apicem axillares basi ramosæ, ramis longissimis elongatis erectis 10 cm. longis, floribus spicatum ad nodos 2-3 aggregatum dispositis, bracteis 3-4 ad basin florum aggregatorum dispositis. Perianthii segmenta 5 obovato-oblonga 1½ mm. longa extus parce intus dense longeque hirsuto-barbata, staminibus 9-10, filamentis filiformibus longe exsertis patentibus 4½ mm. longis parce hirsutis vel glabris, antheris globosis ½ mm. in diametro. Spicæ fl. ♀ ignotæ. Fructus ad rhachidem incrassatam spicatum dispositi spinosi, in circumscriptione globosi 2 cm. in diametro, spinis teretibus usque 1 cm. longis 1½ mm. latis rectis brevis tomentosis dense dispositis. Glans singularis acuta apiculata floccoso-tomentosa.

HAB. Hieranzan, leg. T. KAWAKAMI et S. SASAKI, 1910, Feb. (Fl. et Fr.).

This is very near *C. tribuloides* var. *formosana* SKAN. It may perhaps be identical with SKAN's variety. But the present plant is so widely different from *C. tribuloides* that we are forced to regard it as specifically different from the named species.

**Castanopsis subacuminata** HAYATA sp. nov. *Castanopsis indica* HAYATA Fl. Mont. Formos. p. 204. Rami dense pubescentes. Folia ovato-acuminata apice acuminata 12 cm. longa 3½ cm. lata apice acuminata, basi acuta vel cuneata margine grosse leviterque serrata, (serris ascendentibus introrse recurvis a se 8 mm. remotis brevissimis 2 mm. longis latissimis apice mucronatis), margine inferiore parte cuneata integra supra glabra subtus dense brevissime pubescentia, costis et venis supra leviter impressis subtus

prominentibus, venis lateralibus utroque latere costæ circ. 15 rectis angulo 40° a costa divaricatis, ad apicem serrarum attingentibus, petiolis 1 cm. longis supra planis leviter sulcatis infra convexis pubescentibus. Spicæ ♂ paniculatæ, ramis gracilibus circ. verticaliter erectis vel ascendentibus 10-15 cm. longis dense pubescentibus basi ad insertionem 1-bracteatis, bracteis ovato-triangularibus 4 mm. longis 3 mm. latis crassiusculis apice obtusis vel 2-dentatis vel emarginato-rotundatis basi ad insertionem truncatis non contractis utroque dense pubescentibus; bractea sub flore 1-3 una sita late rotundata acuta vel bi-cuspidata integra vel 2-loba, exteriore hirsuta, interiore glabra 1 mm. longa, bracteolis sub flore sitis  $\frac{1}{2}$  mm. longis triangularibus acutis. Fl. ♂ in bractea singula 1-3, 1-2-bracteolati. Perianthium 6-7 partitum vel lobatum, lobis 3 exterioribus 3 interioribus, extus subglabris intus hirsutis vel longi-barbatis oblongis obtusis 1-1 $\frac{1}{3}$  mm. longis extus 1-costatis, costis latis elevatis. Stamina 15-20, filamentis filiformibus 2 $\frac{1}{2}$  mm. longis, antheris 2-orbicularibus, loculis distinctis. Rudimenta ovarii minuta barbata. Spicæ ♀ terminales vel axillares pauci-ramosæ vel simplices 20 cm. longæ, rhachidibus latere compressis. Fl. ♀ in bractea una solitarii 2-bracteati, bracteis triangularibus. Perianthium 6-lobum, ovarium semi-includens. Styli 3 erecti, ad apicem 1-foveolati vel impressi stigmatosi.

HAB. Kashinro, C. ŌWATARI, III. 1898.

The present plant was formerly referred to *C. indica*; but the plant is slightly different from the Indian species, as is seen from the specimen of the species collected by Mr. T. KAWAKAMI in Mungpoo at an elevation of 8000 ft. (Herb. Taihoku, Mungpoo 8000 ft. India. Jan. 26, 1912, Fl. leg. T. KAWAKAMI). The leaves of this new plant are ovately acuminate, broadest in the lower portion, while those of the Indian species are obovate, broadest in the upper portion.



## Coniferæ.

*Pinus* LINN.

***Pinus brevispica*** HAYATA sp. nov. (Tab. XXXIV). Arbour. Rami fusco-cinerascentes, cicatricibus prominentibus. Folia gemina 10–13 cm. longa acerosa acuta subtus cunaliculata, margine serrulata, utrinque stomatifera, recurvo-luniformia in sectione, (sectione  $750\ \mu$  lata  $400\ \mu$  crassa, canalibus resiniferis centralibus superioribus inferioribus epidermide proximis, iis lateralibus in mesophyllis dispositis, canalibus principalibus in speciminibus nostris 4 interdum 6?; vaginæ 9–10 mm. longæ, squamis membranaceis fuscis margine albido-lacerato-fimbriatis demum deciduis. Gemmæ cylindraceæ apice obtusæ, perulis castaneis margine tenuibus triangulari-lanceolatis acuminatis margine laceratis, (laceris descendento-reflexis) 5 mm. longis basi 2 mm. latis. Flores masculini ad apicem ramorum quasicapitatim dispositi, pseudocapitulis quasi-terminalibus apertiente obovoideis 3–4 cm. longis  $2\frac{1}{2}$ –3 cm. latis, toris capitulorum 1 cm. longis quam floribus in longitudine brevioribus vel interdum longioribus; vel flores ad partem basilem virgulti brevis verticillatim lateraliterque dense dispositi. Pseudo-capitula basi bracteata, bracteis triangulari-lanceolatis 6 mm. longis basi  $2\frac{1}{2}$  mm. latis apice acutis castaneis margine tenuibus hyalinis laceratis introse erecto-recurvis, floribus ad axillas bractearum fertilium singulis, supra basin infra medium stipitem florum bracteolatis, bracteolis 5–6 magnitudine variabilibus extimis et intimisque minoribus interioribus majoribus 2–5 mm. longis ovatis obtusis concavis castaneis margine hyalinis laceratis. Staminum columna (vel fl. ♂) cum staminibus cylindracea, cum stipite  $1\frac{1}{2}$  cm. longa  $1\frac{1}{2}$ –2 mm. lata apice obtusa basi stipite 3 mm. longo instructa, staminibus circ. 50–70 circa rhachin spiraliter dispositis, antheris subsessilibus vel filamentis brevissimis instructis, (appendicibus connectivorum late rotundatis 1 mm. latis  $\frac{3}{8}$  mm. longis margine minute denticulatis, superioribus imbricatis vel eâ leviter attingentibus, cum rhachidibus paralleliter sitis), loculis antherarum basi appendicum connectivorum rhachide transversim sitis obovatis 1 mm. longis rima extrorsa longitudinaliter dehiscentibus. Flores feminei (vel strobili novelli) versus

apicem ramulorum lateraliter siti semper solitarii vel interdum oppositi gemini. Strobili laterales brevissime stipitati 4 cm. longi  $2\frac{1}{2}$  cm. lati ovoidei; squamarum mediocrium apophysi 9 mm. lata 5 mm. longa obscure quadrantiformi, lineis 4 ad centrum convergentibus plus minus prominentibus notata antice rotundata, umbone depresso transversim rhomboideo 1 mm. lato ad centrum mucrone uno descendenti instructo. Semina obovoidea 5 mm. longa  $2\frac{1}{3}$  mm. lata minute purpureo-punctata superne ala membranacea purpureo-striata late cultriformi munita, alis cum seminibus 14 mm. longis 4 mm. latis. Strobili post disseminationem conico-globosi  $4\frac{1}{2}$  cm. longi totiusque lati basi latissimi, in sectione triangulares.

HAB. Formosa: in montibus altissimis, leg. U. MORI.

This is different from *P. taiwanensis* HAYATA in having much shorter male inflorescence, much thicker leaves, as can be seen in a section of the leaves, and in having conical-triangular cones after dissemination.

***Pinus taiwanensis*** HAYATA Materials for a Fl. Formos. p. 307. Descriptio auctata. Flores masculini ad basin virgulti novelli spicatum dispositi, rhachidibus vel virgultis 3 cm. vel 5 cm. longis supra productis, partibus floriferis inferioribus 2-3 cm. longis, bracteis acuminato-lanceolatis 11 mm. longis basi latissimis 2-3 mm. longis castaneis margine hyalinis laceratis, bracteolis sub flore singulo 5-6 oblongis obtusis 6 mm. longis margine  $\pm$  laceratis. Stamina columna (vel flos.  $\uparrow$ ) oblongo-cylindracea 12 mm. longa cum staminibus 4 mm. lata brevissime stipitata, stipitibus 2 mm. longis; staminibus circ. 100 circa rhachin spiraliter dispositis, connectivorum appendicibus semi-globosis  $1\frac{1}{2}$  mm. latis 1 mm. longis margine minute denticulatis imbricatis, antheris sessilibus cuneato-oblongis 1 mm. longis vel longioribus. Semina obovoidea apice obtusa basi acuta  $\pm$  complanata facie opaca rugulosa.

HAB. Mt. centralibus, leg. U. MORI 1910, Aprili.

***Pinus Uyematsui*** HAYATA sp. nov. (Tab. XXXV.) Arbour; rami veteriores cinereo-fuscentes glabri pulvinis vix elevatis transverse oblongis utroque latere cicatricibus perularum minutarum instructis; rami novelli

cinereo-rubescens, pulvinis elevatis; perulæ fasciculorum foliorum brevissimæ latissimæ, præterea bracteolæ 2-3 sitæ. Fasciculus foliorum basi 2-3 annulis instructus. Folia in quovis fasciculo quinque non vaginata, acerosa 6-7 cm. longa facie exteriori viridissima facie interiore glauco-albicantia, sed ad marginem et costam viridiora, ad marginem et costam minute serrulata, costa interiore prominenti, triangularia in sectione, ad costam cuspidato-acuta. Canales resiniferi 2 arcte sub epidermide latere exteriori dispositi, meristela rotundata in sectione. Gemma obovato-oblonga, perulis ovato-oblongo-triangularibus vel lanceolato-triangularibus. Strobili hornotini elliptici 2 cm. longi 1 cm. lati, (pedicellis  $1\frac{1}{2}$  cm. longis) squamis medioeribus rhombicis rotundatis 5-6 mm. longis 5 mm. latis apice rotundatis, bracteis sub squamæ late flabelliformibus late 2 mm. latis 1 mm. longis. Strobili annotini cylindrici 10 cm. longi  $2\frac{1}{2}$  cm. lati basi truncato-rotundati apice gradatim acuto-obtusi, squamis arcte imbricatis margine tenuibus. Stroboli post disseminationem cylindrici 12 cm. longi  $4\frac{1}{2}$  cm. lati, squamis medioeribus obovato-cuneatis (apophysis sensim et leviter incrassatis late rhomboideis apice rotundatis basi acutis  $1\frac{1}{2}$  cm. longis 2 cm. latis), erectis vel leviter reflexis, umbone ad apicem apophysis sito transverse semi-rhomboideo 4 mm. lato 2 mm. longo brevissime apiculato. Semina (persimiliter præmatura) oblique ovata  $\pm$  complanata basi cuneato acuta rotundata 8 mm. longa 4 mm. lata, alis cum seminibus semiovatis 22 mm. longis 6 mm. latis. Embryo cylindricus, cotyledonibus 8,  $\frac{1}{2}$  mm. longis.

HAB. Arisan, ad 7000 ped. alt., leg. U. UYEMATSU.

Here are seven species of 5-leaved pines in Japan and China, from which the present *Pinus* is quite different in having cylindrical long cones. The new species is the most near to *P. formosana* which is different from ours in having ovoidal cones. The scales of the cone of this species are much thinner than those of any other kind of pines.

## Orchideæ.

*Galeola* LOUR.

**Galeola altissima** REICHE.; MATSUM. Ind. Pl. Jap. II.-1. p. 246.

HAB. Biōritsu: Manapan. (Herb. Taihoku Museum.)

Owing to the imperfectness of the specimens, the determination is rather conjectural.

## Scitamineæ.

*Zingiber* ADANS.

**Zingiber Zerumbet** ROSC.; FORBES et HEMSL. Ind. Fl. Sin. III. p. 70.

HAB. Cult. (Herb. Taihoku Museum).

*Musa* LINN.

**Musa insularimontana** HAYATA sp. nov. Caulis subcylindricus, cæspitosus. Folia angustiora. Inflorescentia tenuis curvato-nutans, bracteis ovato-lanceolatis 7 cm. longis 3 cm. latis valde concavis fusco-rubrescentibus concoloris. Flores 8 in singula bractea, 2 seriatim dispositi, sessiles. Fl. ♂: Perigonium cylindraceum latere fissum  $3\frac{1}{2}$  cm. longum apice 5-lobatum, lobis 3 exterioribus et 2 interioribus; lobis exterioribus 2 lateralibus oblongo-triangularibus 5 mm. longis 4 mm. latis apice obtusis dorso corniculatis, (cornibus triangularibus verticaliter compressis) margine integris tenuibus, lobo exteriori centrali ovato apice obtuso non corniculato  $3\frac{1}{2}$  mm. longo totiusque lato; lobis interioribus oblique ovatis, altro latere 4 mm. longis altro 3 mm. longis basi auriculato-cordatis apice obtusissimis margine tenuibus. Petala elliptico-obovata  $1\frac{1}{2}$  cm. longa 1 cm. lata apice truncata vel emarginata ad centrum breve cuspidata, (cuspidibus 1 mm. longis), basi obtusa contracta ad insertionem  $\frac{1}{2}$  mm. lata margine integra (excepto partem apicalem truncatam) apice irregulariter denticulata. Stamina 5 cum calyce æquilonga vel breviora 28 mm. longa, filamentis validiusculis 1 cm. longis,

antheris adnatis linearibus apice connectivis leviter productis obtusis; stylo columnari-filiformi cum staminibus æquilongo apice clavato. Fl. ? non visi. Rhachis teres 3 cm. in diametro sectionis dense pubescens. Fructus præmaturi inæqualiter tetragoni stipitati, stipitibus dense pubescentibus.

HAB. Kōtōshō: in montibus, leg. Y. TASHIRO, Aug. 1912.

Near *M. paradisiaca* which is distinguishable from our plant by its entire free tepal and glabrous rhachis; also near *M. flava* which differs by its broader bracts. This bears some resemblance to *M. celebica* which is however separable from our plant by the umbonate berry. Our plant is also near *M. Bakeri*, but differs from it by the distinct stalked fruits. Fruits of this new species are full of seeds, and therefore not eatable.

**Musa textilis** var. **Tashiroi** HAYATA n. v. Caulis, folia et inflorescentia ut typicæ. Bractea extus purpureo-fuscens intus coccinea (fide TASHIRO), ovato-elliptica 15 cm. longa valde concava, versus apicem inflorescentiæ obovata apice obtusissima basi subeuneata. Fl. ♂: Rhachis glabra; flores 8-clustati basi connati, supra ovarii rudimenta liberi. Rudimentum ovarii 1 cm. longum 3 gono-obconicum. Perigonium 4 cm. longum apice 5-lobatum, lobis 3 exterioribus et 2 interioribus; exterioribus 2 lateralibus apice dorso corniculatis triangularibus apice cucullatis, (cornibus 2-3 mm. longis reflexis), lobo exteriore centrali apice dorso corniculato, cornibus brevioribus verticaliter latis; lobis interioribus oblongis 4 mm. latis apice cucullatis dorso breve et tenuiter corniculatis. Petala lanceolato-oblonga 3 cm. longa 23 mm. lata apice truncato-emarginato-cuspidata vel apice brevissime 3-cuspidata, (cuspidibus lateralibus obtusis, centralibus acutis 1 mm. longis), margine sursum obscure tenuissime remotissime serrulata. Stamina 5 cum sepalis æquilonga 3½ cm. longa, filamentis subcrispatis ± complanatis 1½ cm. longis basi antherarum clavatim incrassatis, antheris linearibus, (loculis undulatis) apice obtuse apiculatis 2 cm. longis; stylo cum staminibus æquilongo columnari-filiformi, stigmatibus clavato densissime villosis. Fructus trigono-cylindracei recurvi glabri ∞-spermi 7-8 cm. longi 2 cm. in diametro sectionis apice breve rostrati (rostris 5 mm. longis) basi stipitati, stipitibus 1 cm. longis cum rostris brevissime pubescentibus. Semina ∞ nigra angulato-rotundato-disciformia 5 mm. in diametro, subnitida.

HAB. Kōtōshō, leg. T. TASHIRO, Aug. 1913; Kwashōtō, (fide TASHIRO).

Differs very slightly from the type in the more patent petioles, scarlet purple bracts, and in the young leaves which are usually reddish on the back.

## Palmæ.

### *Pinanga* BL.

**Pinanga Tashiroi** HAYATA sp. nov. Truncus 6-7 ped. altus, rarius 14-15 ped. altus, 1.5-2 ped. in circumscriptione, basi apiceque urceolato-dilatatus, extus albo-cinereus rugosus, cicatricibus foliorum annularibus, inferioribus 10-15 cm. remotis, superioribus plus remotis. Folia terminalia: vagina 1 mm. longa amplexicaulis ferrugineo-fulva validissima, petiolo 60 cm. longo lamina circ. 2 m. longa circ. 1 m. lata, pinnata subchartacea paripinnata supra glabra viridissima nitida subtus pallidiora, pinnis alternis vel oppositis lanceolatis apice acuminatissimis 4-5 cm. latis basi 2 cm. latis, 2-3-4-nervatis, nervis supra plus elevatis subtus minus elevatis; subtus ad nervos tomentellis, pinnis superioribus latioribus apice laceratis, rhachidibus 5-6 mm. latis medio costatis, costis supra anguste elevatis subtus late elevatis, supra glabris subtus  $\pm$  tomentellis, cum petiolis conformibus. Paniculæ infra prope apicem trunci 3-5 pendulæ 40 cm. longæ ramosæ, ramis circ. 30 simplicibus 25 cm. longis fructus spicatim gerentibus. Perianthii segmenta fructiferi 6, 3-mera late rotundata 5 mm. lata 4 mm. longa. Fructus ovoidei apice conico-acuti basi obtusi 18 mm. longi 12 mm. lati coccinei 1-spermi. Embryo basilaris, albumen ruminans.

HAB. Kōtōshō, leg. Y. TASHIRO, Aug. 1912.

Very interesting palm. Through the courtesy of Mr. E. D. MERRILL, I have learnt that the palm is closely allied to the Philippine *Pinanga Barnesii* BECC. Our palm is, however, different from that species in its taller and thicker trunks, and in its smaller fruits. It was first, some years ago, discovered by Mr. Y. TASHIRO in the island of Kōtō (Botel Tobago). It grows in a dense forest in the central parts of the island on

an altitude of about 1000 ft. It extends sometimes over an elevation of 1800 ft. above the level of the sea, when the elevation is surrounded by the several mountain ranges. The palm is of rather small size. The trunk is usually 6-7 ft. high, and even the tallest does not exceed 15-16 ft. It is generally larger than that of *Areca Catechu*, attaining 1.6-2.2 ft. in circumference, urceolately swollen at both top and base. It is ashy-white, rugose; scars of leaves are annularly arranged, and 3.3-5 inches distant at the basal parts of the trunks, but gradually remoter towards the top; sheath nearly 3 ft. long, iron-brown. Leaves terminal, (excepting vagina) 7-8 ft. long (including petioles), 3-4 ft. broad pinnate, deep green shining, petioles 2 ft. long. Panicles 3-4-5, hanging from the apical portions of the trunks, branched; branches nearly 30, 7-9 inch long, each bearing nearly 40 fruits. Fruits sessile deep scarlet.

### Eriocauleæ.

#### *Eriocaulon* LINN.

##### **Eriocaulon Merrilli** RUHL.

HAB. Formosa: Loco non indicato (Herb. Taihoku Museum.)

Determined by Mr. T. KAWAKAMI at Manila in his trip to the Philippines.

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**\*On the systematic Position of *Mitrastemon*, as a  
Genus representing a special Tribus of  
the Rafflesiaceæ.**

By

B. HAYATA.

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**CONTAINTS.**

- I. Introduction.
  - II. External Morphology of *Mitrastemon*, especially with regard to its systematic Position.
  - III. Inner Morphology of *Mitrastemon*, especially with regards to its systematic Position.
    - 1. Anatomy of the intramatrixal Tissue.
    - 2. Structure of the Peduncle.
  - IV. Systematic Position of *Mitrastemon*.
  - V. Résumé.
  - VI. Literature consulted.
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**I. Introduction.**

More than thirty years ago, there was recorded from Kiushiu (TASHIRO), a southern island of Japan, a flowering parasite of very peculiar character widely different from any other plant, whether parasitic or not, then known in Japan. The record of the parasite then given was an extremely imperfect one, with a very rough sketch of a specimen of a peduncle without any attaching organ, and apparently lacking one of the genital organs. For a long time, it did not come to the notice of any professional botanist, either

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\* An article in German on this same subject appeared in ENGL. Bot. Jahrb. LI. Heft.-1, pp. 164-176, T. I.

at home or abroad, until nearly five years ago, when another specimen also in a very imperfect state was found in Shikoku, another southern island of Japan. The plant was then first examined by T. MAKINO (MAKINO I., p. 326), who with some hesitation regarded it as a plant possibly referable to the Rafflesiaceæ. His opinion was based presumably on a consideration of only the external features of the plant, and not upon a careful examination of the morphological structure of the flowers, and certainly without studying its attaching organ or its anatomical character. It was considered by him to be a plant representing a new genus, and was then first named *Mitrastemon Yamamotoi* MK. Later on, towards the end of 1911, an exhaustive description of the plant, beautifully illustrated, was given by T. MAKINO in the Journal of the Tokyo Botanical Society. In this article he regarded the plant as representing a new family, the Mitrastemonaceæ, distinguishable from the Rafflesiaceæ by its having a gamophyllous cylindrical and truncate perianth, a mitriformed staminal column and a superior ovary. A little previously, i.e. in 1910, another plant much like the former was found in the southern part of the island of Formosa. This parasite, being far larger than the Japanese plant and differing slightly from the latter, was consequently described by me as a new species, *Mitrastemon Kawasakii* HY. (HAYATA I. p. 112). In my then description of this new parasite, I was merely following MAKINO, and did not in detail go into the systematic position of the plant. Later on, I became strongly of opinion that the plant belonged to the Rafflesiaceæ, and accordingly transferred it to that family (HAYATA II., p. II.).

As I have said above, *Mitrastemon* was first referred to the Rafflesiaceæ, then was considered to represent a new family, and even to be comparable to the Nepenthaceæ (MAKINO II., p. 252). Consequently, the systematic position of the plant has been much confused. In the present paper, it is my desire to make a few remarks about the systematic position of the parasite when considered from the point of a comparison of its morphological and anatomical characters with those of other families; and more especially from a deliberate consideration of the different characters which separate our parasite from all the plants at present referred to the Rafflesiaceæ, to decide

whether the said characters necessarily prevent it from being taken into the same family, or in other words whether the differences are such as separate genus from genus or family from family.

So far as I am aware, a discussion of this kind on *Mitrastemon* has never been undertaken. Moreover, there is no work on the anatomy of the intramatrical tissue, the flower-peduncle, or the structure of the ovules, which collectively make up a group of characters which are as important as any other floral characters for the determination of a systematic position. In this paper, I shall first consider the morphology of the plant both external and internal, especially so far as is necessary for the present discussion and then in its bearings on the systematic position of the plant itself.

## II. External Morphology of *Mitrastemon*, especially with regard to its systematic Position.

\*The plants are leafless, unbranching, single flowered parasites growing on exposed roots of *Quercus cuspidata*. Roots over 1 cm. in diameter frequently bear numbers of these plants. The volva is always in colony, separate, or confluent below, short, globose, erect, sessile, dark fulvous. Peduncles simple, thick, straight or sometimes slightly curved, terete or subcompressedly terete, smooth on surface, provided with scales. Scales opposite in 5 or 6 pairs, imbricate, decussate, concave, margin adnate to the peduncles at the base, forming tubes in the basal portions, where honey-like fluids are secreted in abundance.\*\* Scales are more or less shining owing to a small quantity of a fluid secreted on the surface, especially when the flowers are in bloom. Flowers are always hermaphrodite and usually regular, but sometimes more or less diclinous, especially in the earlier stage of flower-development. Of the four primordial leaves which compose the perianth, the front and back ones are usually broader than the lateral pair. In many cases, they, in a

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\* The reader is requested to refer to the original description of *Mitrastemon Yamamotoi* M.K. contributed by Mr. T. MAKINO to the Tōkyō Bot. Mag. XXV. p. 252, T. VII. and *M. Kawasaki* HAY. in the same journal, XXVI. p. 112.

\*\* In the flowering season, this honey attracts large numbers of a bird resembling a Japanese white eye, (*Zosterops japonica* T. et Z.).

strict sense, lack the radial symmetry, as is the case with many flowers of the *Rafflesiaceae*. They are solitary, terminal, subterete. The perianth-tube is hypogynous and firmly attached to the ovary. It is usually truncate or sometimes 4-lobed at the apex, seemingly like the perianth of *Pilostylis* and sometimes like that of *Apodanthes* (SOLMS-LAUBACH I., p. 12) but differs in being hypogynous. The perianth is 4-merous, as is seen in the very early stage of the flower-development, and also in fully developed flowers which have sometimes the perianth 4-lobed. The existence of this 4-lobed perianth in *Mitras-temon* escaped the attention of the previous authors who recorded it as having an entirely truncate tube without any lobe, which lobeless perianth they regarded as one of the peculiar characters separating the plant from the *Rafflesiaceae* (HAYATA I., p. 112; MAKINO II., p. 253). Corolla none. Stamens deciduous, hypogynous, erect, connate into a cylindrical cap, entirely covering the gynæcium, as in *Pilostylis aethiopica* (LOTSY p. 881), filaments entirely connate into a broad tube, dehiscing vertically on one side. Anthers numerous connate into a broad belt-like cap which covers the stigma. Anther-cells, quite irregularly and closely arranged in many series on the above mentioned belt-like cap. They are separated by thin walls, and outer walls are especially very simple. A fibrous layer lacks entirely. They are very like those of *Pilostylis* (LOTSY p. 881, Fig. 612, 3, 4, 6). Connective-tips connate into a cap with a very small opening at the apex. Ovary, entirely superior, sessile, ovoid, one-celled, with parietal placentas, 9-13 in numbers, (or more in *M. Kawasaki* HAY). The ovary is much like that of *Apodanthes* (SOLMS-LAUBACH I., p. 12) in its structure, but differs from it in being superior. The placentas are lamelliformed, thick, fleshy. Style, crowning the top of the ovary and articulated to it, erect, short, very thick, conical. Stigma, semi-spherico-conical, umbonate at the top with an obscure groove on one side. In shape, the style and stigma are much like those the female flowers of *Pilostylis* and *Apodanthes* (SOLMS-LAUBACH I., p. 13). Ovules, minute, obovoid-ellipsoid, with a short or long funicle, anatropous; integument, composed of a single layer of cells, as is also the case with the nucellus. The structure of ovules are very much like to that of the *Rafflesiaceae* more than that of any other parasitic plants (GOEBEL II., p. 368-369;

SOLMS-LAUBACH VI.). Fruit baccate, slightly larger than the ovary, and comparable to that of the *Apodantheæ*. In the case of a plant which was sent from its native locality, and kept growing in a pot in a green-house here in Tōkyō, I have observed that the style which at the base is jointed to the ovary is, when the fruit is fully ripe, separated by a slit along the articulation. Seeds minute and very numerous, with a hard reticulated testa like those of rafflesiaceus plants.

### III. Inner Morphology of *Mitrastemon*, especially with regards to its systematic Position.

#### 1. Anatomy of the intramatrix Tissue.

The intramatrix tissue of the parasite in the host root is entirely of the kind generally called a "thallus" which, in its main parts, exists in the bast of the host root. It is a formless mass just under the peduncle of a flower in the bast and soon separates into a number of threads running right and left along the long axis of the host root; anastomosing with each other, and forming a network which completely surrounds the host-root in the middle layer of the bast and on the outer side of the cambium layer. Flower peduncles are generally found most profusely on roots 1 cm. or more in diameter. From each thread of the network-thallus a number of smaller threads much finer than the preceding are sent out perpendicular to it towards the center of the xylem. For convenience sake, I shall call a thallus-thread running horizontally along the long axis of the root in the bast-region a horizontal thread, and one running vertically towards the center of the xylem a vertical thread. The horizontal threads in the bast are composed, as is seen in a cross section of the host root, of rounded plasmatic cells in the periphery, but of a elongated ones towards the center, and in most cases there are found near the center some tracheids with spiral markings. The peripheral plasmatic cells, it seems to me, are comparable to the phlōm of highly organized plants in their function, while the central somewhat elongated tracheidal cells resemble the xylem of the same in their function. Towards their ends, the threads, both vertical and horizontal,

become very much finer until at last the thread consists of a single row of cells, which is called by SOLMS-LAUBACH a mycerium-thread, on account of its resemblance to a fungus-hypha (SOLMS-LAUBACH II., GOEBEL I., p. 435). Accordingly in every cross section of a region in or near the place where a flower-peduncle stands, we shall invariably find in the bast a number (30-50) of rounded points, each distinct and remote, or sometimes coming into contact and uniting, every one of which is a cross section of a horizontal thread, arranged in a ring or two all round the xylem. Each of these points throws a perpendicular thread through the cambium layer and xylem, along a medullary ray towards the center. The surface view of the network of horizontal threads in the bast is clearly and easily observable with the naked eye in the process of removing the outer parts of the secondary bast. Therefore, the intramatrical tissue in the bast forms a cylinder-like body made of reticulated threads, which completely surrounds the xylem outside the cambium layer. It is justly comparable in some respects to that of *Cytinus* which lies in the bast as a true, perfect, but unreticulated cylinder inside the cambium layer. The thallus of *Mitrastemon* bears even more resemblance to that of *Burgmansia* (SOLMS-LAUBACH, IV.) and *Pylostylis* (SOLMS-LAUBACH II., LOTSY p. 882). Such a structure of the intramatrical tissue is considered, at the present time, to be a character peculiar to the Rafflesiaceæ and never observed in any other family. The only connection of this tissue to one of another kind which we call a "senker," is to be found in *Arceuthobium Oxycedri*, a plant belonging to the Loranthaceæ (GOEBEL II., p. 379). The perpendicular threads are by no means terete like the horizontal, but are laterally compressed. Accordingly in the cross section of a vertical thread, which is obtainable in a tangential section of the host-root, it comes into view as a lentiform group of cells always laying side by side with a medullary ray, or sometimes laying in a group of bast cells. It is broader and thicker towards the base (i. e. the bast), but narrower and thinner towards the center of the xylem, and at last becomes a thread consisting towards the apex of a single row of cells.

Therefore, in a longitudinal section of the host-root, and also in a cross section of the same, the vertical threads always appear in the shape of an

elongated wedge with a long thread at the apex. The thread which lies deep within the xylem, after having finished its physiological function, is found dead and buried deep in the xylem. The vertical threads are composed only of rounded parenchymatous cells which are rounded at the basal portions but by and by become elongate towards the apex, especially in the apical portions which are composed of a single row of cells.

The horizontal threads become more and more slender as they recede from the flower-region, and show no more differentiation of peripheral parenchymatous and central tracheidal tissue, and in much remoter regions, say 20 or 30 cm. from the flower-regions and in the part of the root where it attains nearly 2 mm. in diameter (in main or adventive roots), they remain as threads composed each of a single row of cells in or just above the cambium-layer. This shows how widely they are spread over the host root. They are by no means straight, but always anastomosing and running in a zig-zag manner. In longitudinal sections of the host-root, they appear, not as straight lines, but as interrupted or dotted lines. The vertical threads are usually larger in parts near the floral polster, but become shorter in remoter regions. As the horizontal threads reticulate themselves, so do the vertical threads in the region of the xylem, mostly at their apical portions towards the center of the pith. There the vertical threads push out formless branches towards the apex of the host-root, along its long axis, parallel to the horizontal threads in the bast. Here we have another kind of horizontal threads which connect the vertical threads in the xylem, making an irregular network. This network is composed of irregular threads composed of single rows of rounded cells which are very much larger than those in other parts of the intramatrix tissue, and are of very irregular amoeboid shape. The vertical threads which run usually side by side with the medullary rays are easily distinguished from their companions by their having elongated rounded cells full of plasmas, with much larger nuclei, and smooth and much thinner walls. The cells of the medullary rays, in contrast to those of the vertical threads, are usually rectangular, and have pitted and thicker walls. The intramatrix tissue is generally distinguished from the host tissue by its taking a much deeper stain with any staining matter, for example with

DELAFIELD'S Hematoxylin solution.

While the horizontal threads in the bast sends inwards, in cross section of the host-root, one vertical thread towards the center, they push outwards two or three short branches towards the bark; but they seem to have no important function, not even of absorption.

In cross sections of a remoter part towards the host-apex, i.e. a region where the root is nearly 3-5 mm. in diameter, we find a thallus consisting of single-rowed cells near or in the cambium-layer. The cells, the outer-most one especially, of the thallus of this region are, in almost all cases, comparatively large, and each, the outermost one especially, contains 2-4 or sometimes as many as eight nuclei. The nuclei are at one time round and at another dumb-bell-shaped, sometimes curved, fusiform or elongated, and the nuclei in the same cell are of very different sizes, some being small, others quite large. They are, in my opinion, as considered from their being very variable in shape and size, and from the position of their cells, possibly formed, not by indirect, but by direct division. The nuclei just mentioned are nearly of the same shape, as those formed by amitose in the cells of *Characeæ*, *Tradescantia* (STRASBURGER I., p. 77, II., pp. 24-45), and in those of a root-bulbulus infected with a kind of mycorrhiza (SHIBATA, p. 644-672). Here, in the present case, the nuclei take, it seems to me, at first a very irregular amoeboid shape, then curve and fold, at last contract at the middle, and divide into two. I have also observed a case where two nuclei thus formed seemed to have come into contact and probably to have united again. Whether nuclei thus divided by amitose division have the ability to divide mitotely or whether they have that ability then first when their union is accomplished, I am not in a position to decide, nor does that question come within the purpose of the present paper. It is quite probable, however, that this amitose division has been caused by the supply of too much nourishment, just as is seen in the cells of endosperma and those of a root-bulbulus infected with a kind of mycorrhiza (STRASBURGER l. c., SHIBATA l. c.).

On comparing the tissue of the infected host-roots with that of uninfected, we find that the secondary bast of the former is usually extremely swollen, and there is no considerable amount of lamellæ of depressed sieve



tubes caused by so-called "obliteration" (TSCHIRCH p. 345); while the secondary bast of the latter is not at all swollen, and there is present a considerable amount of the depressed lamellæ of sieve tubes. We also find here that the swelling of the bast-tissue is especially large in the floral polster. This is possibly ascribable to the same cause as that to which we ascribe the similar effect in the case of galls (KERNER p. 472) and mycorrhiza (SHIBATA l. c.)

The intramatrical tissue, when fully grown, produces endogeneously a flower-bud, which breaks up the bark of the host-root, and protrudes upwards a peduncle, just as in the case of a plant of the *Rafflesiaceæ*. (SOLMS-LAUBACH I., p. 3; II., IV., LOTSY p. 833).

## 2. Structure of the Peduncle.

The peduncle of *Mitrostemon*, as is usually the case with a parasite, is extremely primitive in its anatomical structure. The tissue is formed by nearly round parenchymatous cells which are largest towards the center of the tissue mass and become gradually smaller towards the epiderm. Inter-cellular spaces are greater towards the center and smaller towards the periphery, and there are practically none at all outside of the ring of vascular bundles. The epiderm has no stoma. There are 5-10 horse-shoe shaped or semi-circular, outward-curving, vascular bundles around the central pith. They are scattering when few in number, but come into close contact, when there are many of them. Towards the epiderm on the outside of this broken ring of vascular bundles, there are sometimes seen a very few small bundles which seem to run into scales on the peduncles. There is generally in the center of a bundle, in cross section, a group of a few spiral tracheids arranged in a curved line, which is almost completely surrounded by layers of plasmatic cells. The layer of plasmatic cells is thicker on the outer side of the tracheidal bundles, than on the inner side. The cambium-layers, or rather a few cambium-cells, are found just outside of, and close to, the tracheidal-groups. The tracheidal cells here represent a primitive xylem, and the surrounding plasmatic cells an as yet undifferentiated bast. I found,

in a very few cases, very primitive ducts, annular or spiral, within the tracheidal group. I could not discover any true well-formed ducts. Neither sieve-tubes, nor companion cells, nor bast fibres, nor wood-fibres are found anywhere. There are one or two collenchymatous rather rounded rectangular cells near the bundles. The whole tissue like the host itself contains a considerable amount of tannin. The structure of the peduncles is, upon the whole, quite similar to that of *Cytinus*, differing from it only in that it lacks well-formed pitted or annular ducts.

#### IV. Systematic Position of *Mitrastemon*.

As is stated above, *Mitrastemon* bears a close affinity to plants at present referred to the Rafflesiaceæ and especially to those of the Apodanthææ, a tribe of the same family. It also resembles in some respects the Nepenthaceæ, Hydonoraceæ, Aristolochiaceæ and Balanophoraceæ (MAKINO II., p. 253). It comes near the Nepenthaceæ (WUNSCHMANN) in having single perianth and superior ovary; but greatly differs from it in having peculiar parasitic organs, united stamens, one-celled ovary with many parietal placentas and gamophyllous perianth. It resembles the Hydonoraceæ (SOLMS-LAUBACH V.) in its parasitism, its leafless, one-flowered-peduncles, but differs in having united stamens, one-celled ovary with many parietal placentas and berry-form fruit. Its affinity to the Aristolochiaceæ (SOLEREDER) is to be seen in the gamophyllous perianth, one-celled ovary, berry-form fruit and short columnar styles; but it is quite distinct in its parasitism, leafless peduncles and united stamens. It somewhat resembles the Balanophoraceæ (ENGLER) in having a parasitic habit, and scaly leafless flower-stalk; but the difference in floral structure is so great that it hardly needs pointing out.

As we have seen in external as well as the internal morphological characters, *Mitrastemon* has a close relation to the Rafflesiaceæ, in its absorption-organ, unflowered leafless peduncles, tetramerous perianth, one-celled ovary with parietal placentas, short columnar style and stigma, and in the structure of its ovules. The only points which formerly led us to

hesitate to refer this plant to the Rafflesiaceæ, are its having an entirely superior ovary and mitraformed united stamens (HAYATA I., p. 112; MAKINO II., p. 253). As to the difference of the staminal structure, however, the connection of *Mitrostemon* with rafflesiaceous plants is to be found in the stamens of *Pilostylis* (SOLMS-LAUBACH I., p. 13; LOTSY p. 881) where the one-celled anther-cells are arranged in a few series around the stigmatic disc, and in those of *Mitrostemon* where one-celled anthers are arranged in many series and in an irregular way on a staminal tube covering the style and stigma. Regarding the difference of the position of the ovaries, the relation is also to be found in *Apodanthes* which sometimes has a semisuperior ovary (BENTHAM et HOOKER III., p. 118). Moreover, the position of the ovary cannot by itself to be considered as a sufficiently reliable character to determine the systematic position of a family. As we see in many families in every division of phanerogamous plants, many cases occur in which plants having a superior ovary and others having an inferior ovary are included in one and the same family, and there are even cases in which plants having ovaries which are both superior and inferior are included in one and the same genus, as we see in *Asarum*, a genus of the Aristolochiaceæ. Among gamopetalous plants (BENTHAM et HOOKER II.), the following families are mentioned as those which include plants with superior and inferior ovaries:—Apocynaceæ, Campanulaceæ, Goodeeniaceæ, Myrsinæ, Primulaceæ, Compositæ and Styracaceæ. Among Polypetalæ (BENTHAM et HOOKER I.): Bruniaceæ, Celastrinæ, Ficoideæ, Hamamelidaceæ, Holoragaceæ, Melastomaceæ, Myrtaceæ, Olacinaceæ, Portulacaceæ, Rhamnaceæ, Rhizophoraceæ, Rosaceæ, Samydaceæ, Saxifragaceæ and Connaraceæ. Among Monochlamydeæ, (BENTHAM et HOOKER III.):—Balanophoreæ Chenopodiaceæ, Cupuliferæ, Lauraceæ, Monimiaceæ and Santalaceæ. Among Monocotyledones (BENTHAM et HOOKER III.): Bromeliaceæ and Liliaceæ.

As we have stated above, *Mitrostemon* is closely related to the Rafflesiaceæ in several points, and even the points which led us previously to regard it as different from the Rafflesiaceæ (HAYATA I. p. 112; MAKINO II. p. 252) do not present sufficient characters to warrant the erection of a

special family for the plant. I am, therefore, at present, strongly inclined to refer this plant to the *Rafflesiaceæ*. In so doing, however, it is necessary to broaden the definition formerly given to the *Rafflesiaceæ* (SOLMS-LAUBACH I., p. 1; ENGLER-GILG, p. 176) so far as to note that the family rarely has a superior ovary, or mitraformed united stamens.

That being done, the question arises, to what tribe of the same family should *Mitrastemon* be referred. There are, at present, three tribes, i.e. *Rafflesiæ*, *Apodanthæ*, *Cytiniæ* (SOLMS-LAUBACH I.). The present plant comes nearest to *Apodanthæ* in the shape of its perianth, ovary and stigma, but differs in having mitriformed united stamens and an entirely superior ovary. After considering the extent of the differences which separate above mentioned three tribes from one another and the points in which this plant differs from all the tribes at present known, I am driven to the conviction that it would be better to make a special tribe for it, as was once suggested by T. MAKINO, and to place it next to *Apodanthæ*. It is to be granted that one might refer this plant to the *Apodanthæ* (SOLMS-LAUBACH I., p. 8 and 12) by greatly changing the definition of that tribe. The difference between this plant and *Apodanthæ* is, however, sufficiently great to make it not unworthy of a special tribe of its own.

The relation of this newly established tribe to the other three, is shown below. Here, so far as is possible, I have followed SOLM's system as to the arrangement and definition of the tribes (SOLMS-LAUBACH I., p. 8.).

- A. Germen floris feminei et hermaphroditi irregulariter lacunosum inferius, ovulis ad lacunarum parietes numerosis hemianatropis, integumento unico. Columna apice dilatata antheras infra marginem gerens. Tribus I. *Rafflesiæ*.

- B. Germen floris feminei uniloculare, placentatione parietali. inferius vel superius.

- a* Ovula ad parietem germinis sessilia stipitata anatropa, integumentis binis instructa. Antheræ bi-tri-verticillatæ, poro apicali transverse dehiscentes; germen inferius.

Tribus II. *Apodanthæ*.

- β Ovula ad parietem germinis plus minus stipitata, anatropa, integumento unico instructa. Antheræ connatæ multiseriatæ mitram formantes. Germen superius.

Tribus III. *Mitrastemoneæ*.

- γ Ovula placentis prominentibus varie divisis insidentia, atropa, integumento unico prædita. Germen inferius.

Tribus IV. *Cytineæ*.

## V. Résumé.

*Mitrastemon* has a close affinity to the *Rafflesiaceæ* in its external as well as its internal morphology. It differs from the same family in its having an entirely superior ovary and mitraform united stamens. These differences are not such as differentiate families, but are rather tribal or generic. To refer the plant to the family named, it is necessary to extend the definition formerly given to it to such an extent as to recognise that it has usually an inferior ovary but sometimes a superior ovary and mitraform united stamens. The points differentiating this plant from the three tribes we have at present in this family, are sufficiently great to make it not unworthy of having a special tribe established for it. The new tribe *Mitrastemoneæ* should be placed next to *Apodantheæ*.

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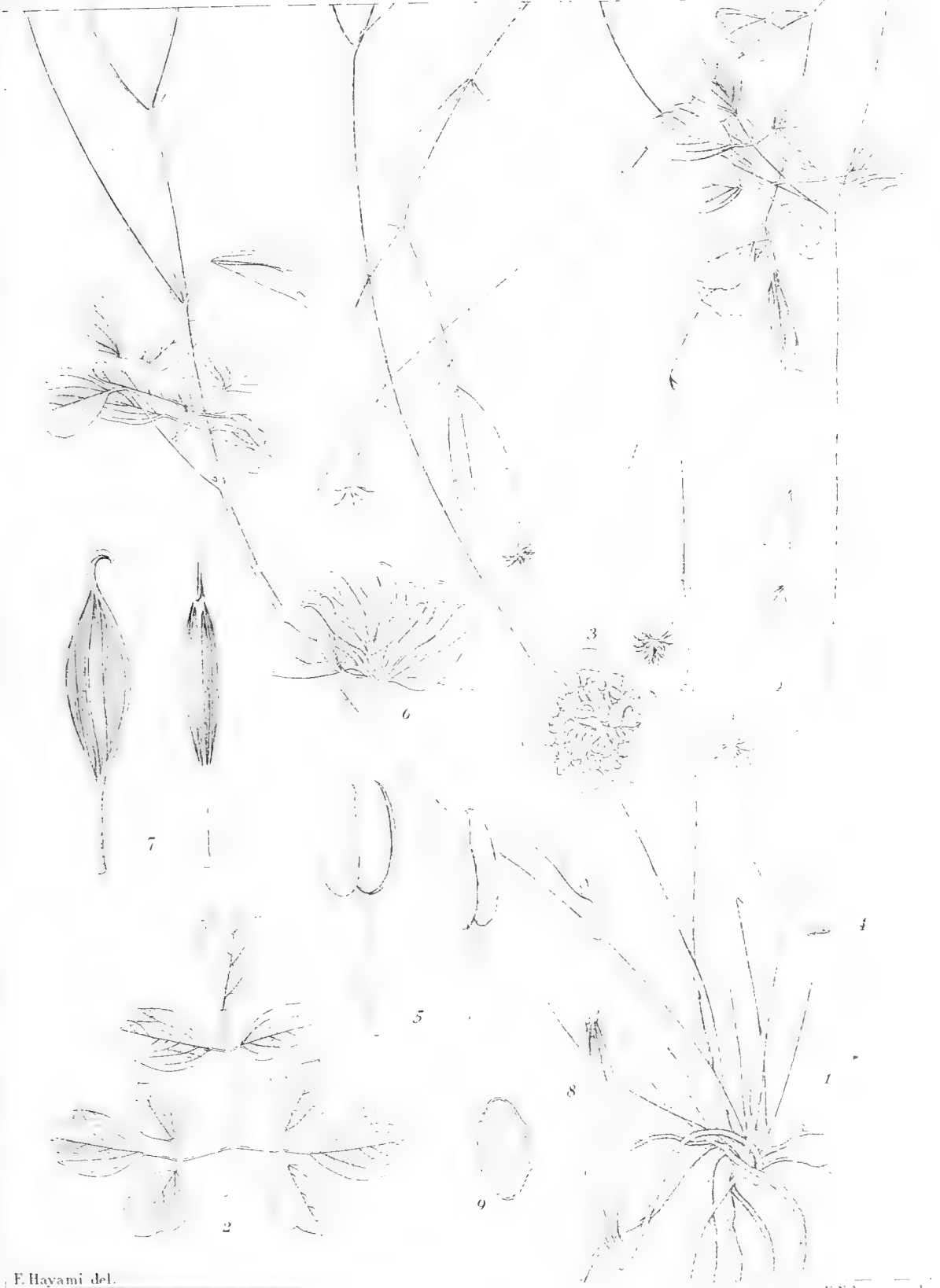
**III.**

PLATE I.

## Explanation of Pl. I.

*Thalictrum micranthum* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A flower.  
4. A petal.  
5. Stamens, front and lateral views.  
6. Fruits.  
7. Achenes, seen from different sides.  
8. A seed.  
9. Cross section of the same.





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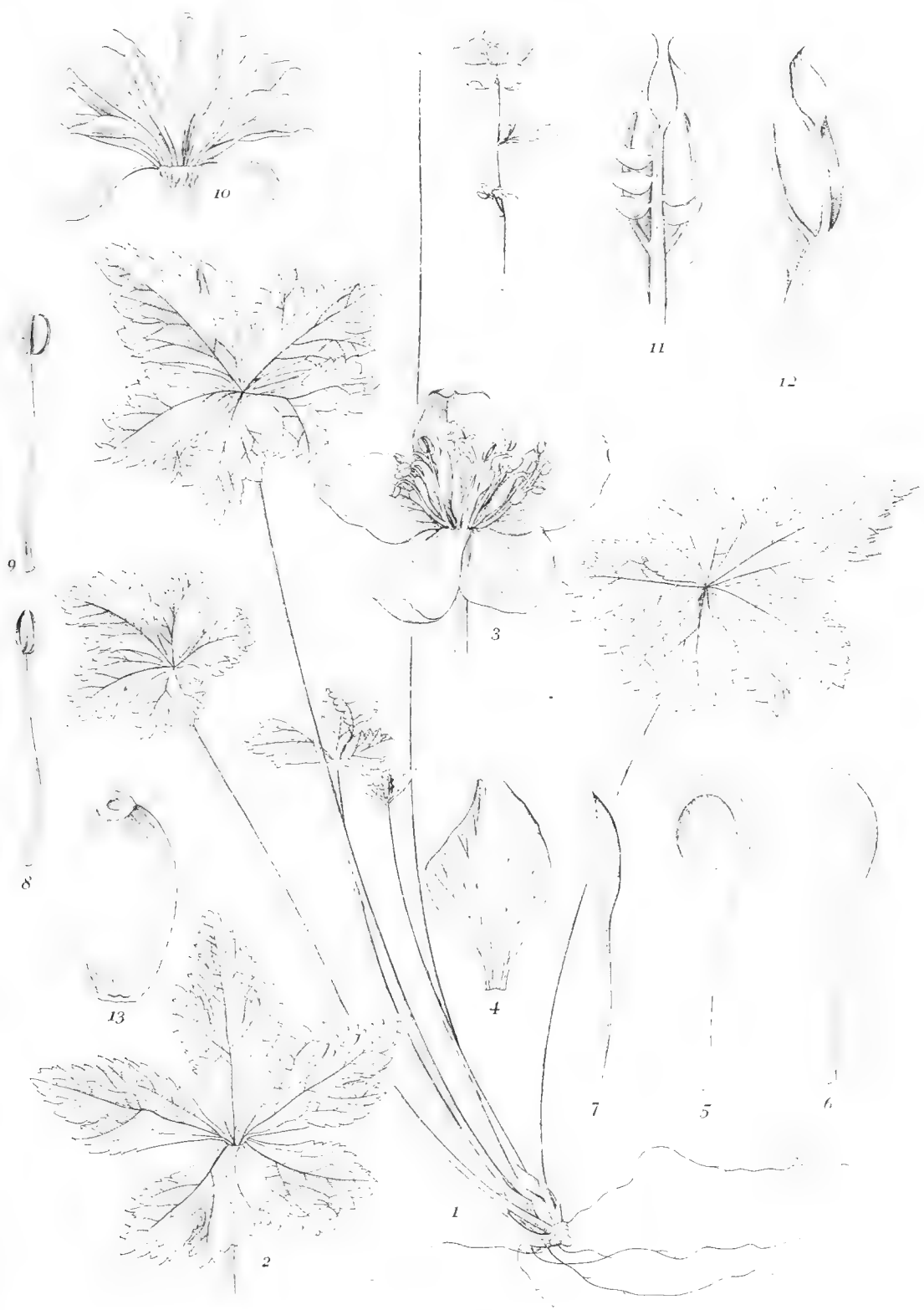
**III.**

PLATE II.

## Explanation of Pl. II.

*Coptis Morii* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A flower.  
4. A sepal.  
5. 6. 7. A petal, seen from different sides.  
8. 9. A stamen, seen from different sides.  
10. Fruits on the receptacle.  
11. A fruit, expanded.  
12. The same, not expanded, seen from side.  
13. A seed.







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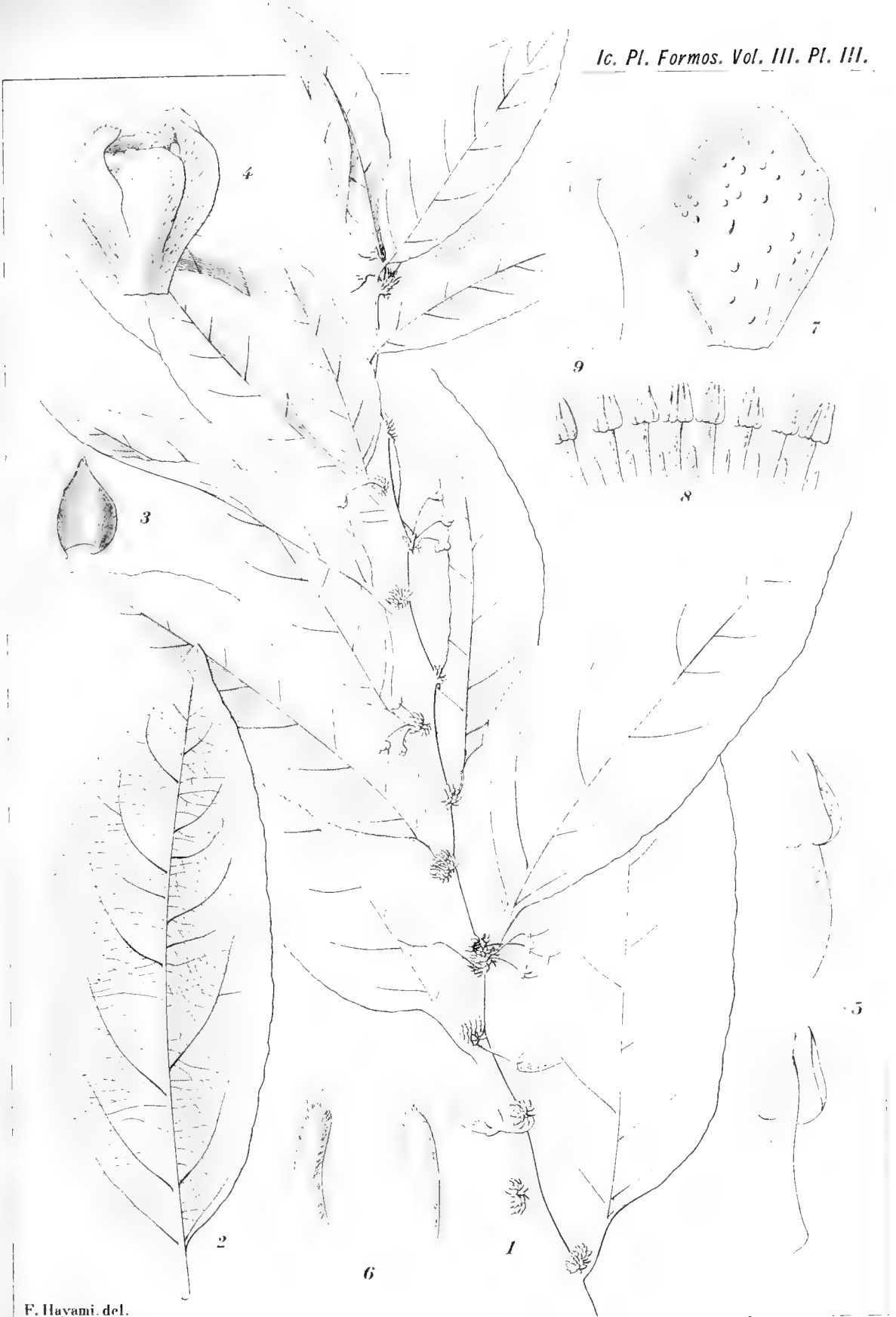
III.

PLATE III.

### Explanation of Pl. III.

*Casuaria Merrilli* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A bract.  
4. A flower.  
5. Stamens, seen from different sides.  
6. Staminodes.  
7. A calyx-lobe.  
8. Stamens and staminodes.  
9. An ovary.





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III.

PLATE IV.

### Explanation of Pl. IV.

*Garcinia multiflora* CHAMP.

- Fig. 1. The plant.  
2. A leaf.  
3. A flower.  
4. The same, petals and stamens taken off.  
5. A petal.  
6. 7. 8. Staminal bundles, seen from different sides.  
9. Anther-cells.  
10. A stigma of the rudimental ovary.







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III.

PLATE V.

### Explanation of Pl. V.

*Ameslea fragrans* WALL. var. *lanceolata* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A flower.  
4. A lower sepal.  
5. A marginal portion of the same.  
6. Corolla.  
7. A flower, corolla and stamens taken off.  
8. A petal.  
9. Stamens.  
10. Vertical section of an ovary.  
11. Cross section of the same.





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III.

PLATE VI.

## Explanation of Pl. VI.

*Thea parvifolia* HAYATA.

- Fig. 1. The plant.  
2. Basal portion of a flower, stamens and petals taken off.  
3. A bract.  
4. A sepal.  
5. An inner sepal.  
6. Corolla expanded.  
7. 8. Stamens, seen from different sides.  
9. An ovary in vertical section.  
10. Apical portion of a style.







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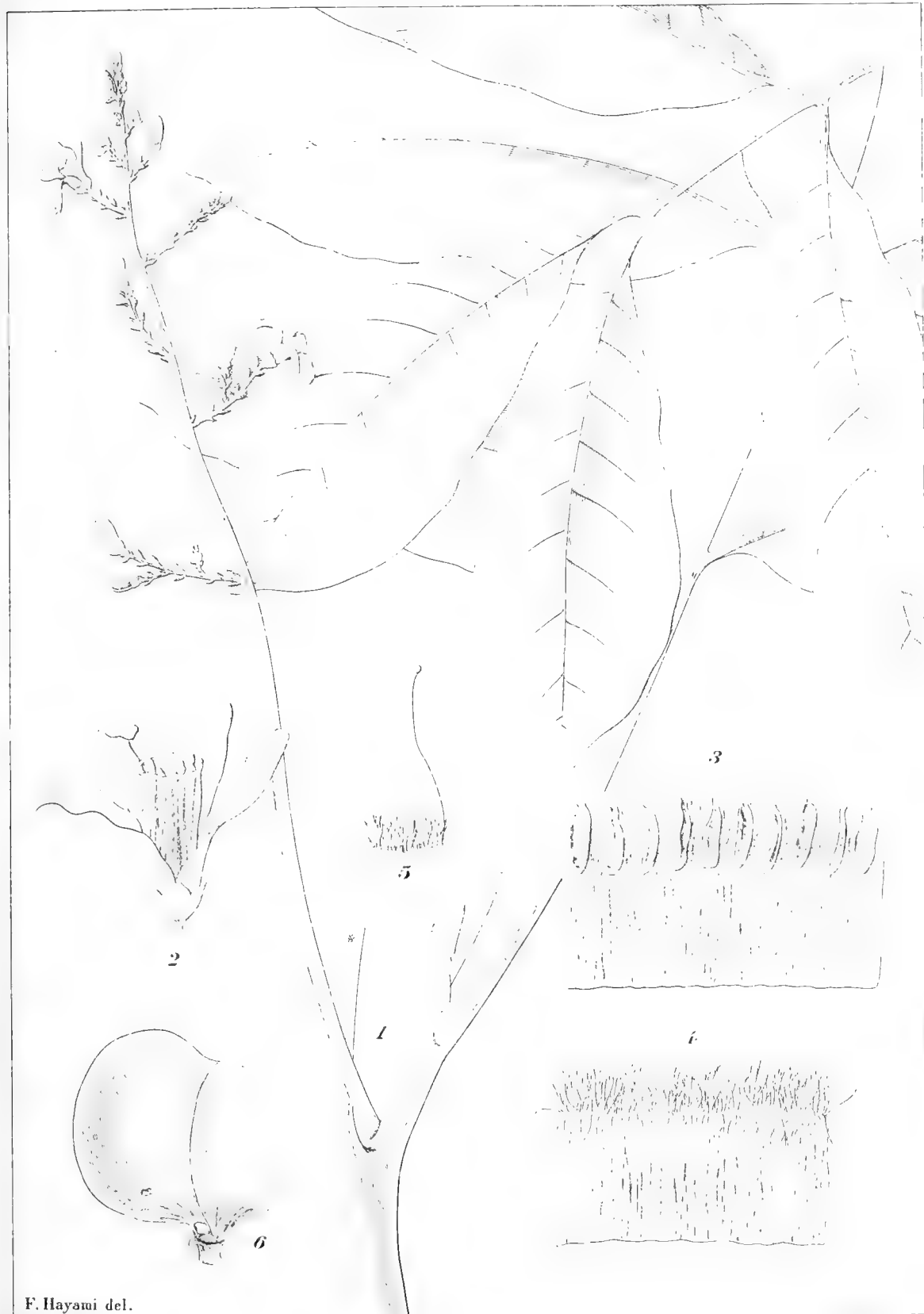
**III.**

PLATE VII.

### Explanation of Pl. VII.

*Clisocheton kusukusense* HAYATA.

- Fig. 1. A branch.  
2. A flower.  
3. Staminal tube, expanded.  
4. Disc-tube, expanded.  
5. An ovary.  
6. A fruit.





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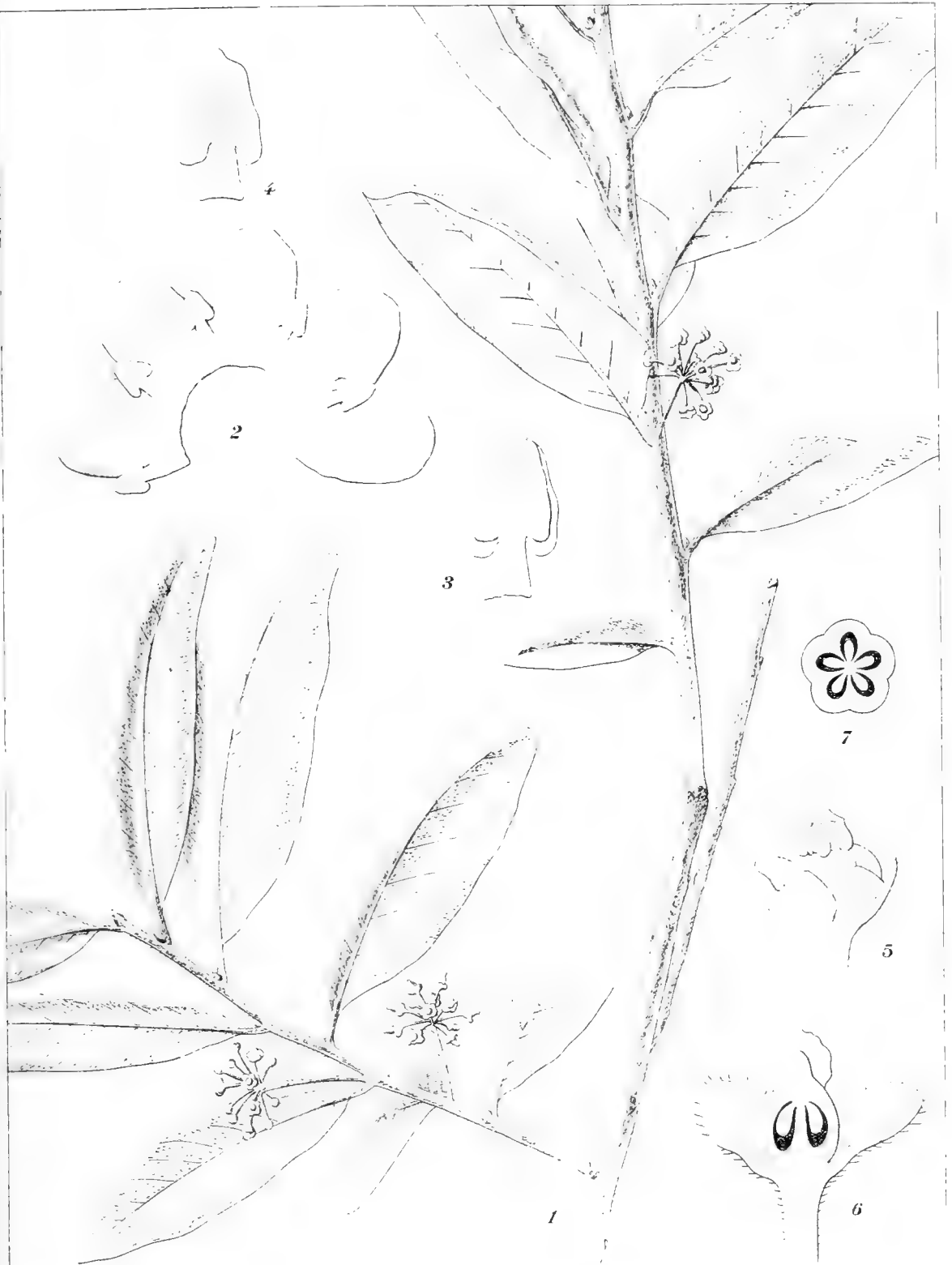
III.

PLATE VIII.

### Explanation of Pl. VIII.

*Ilex lonicrifolia* HAYATA.

- Fig. 1. A branch.  
2. Corolla, expanded.  
3. A stamen.  
4. The same, seen from another side.  
5. A flower, corolla taken off.  
6. The same, in vertical section.  
7. Cross section of an ovary.







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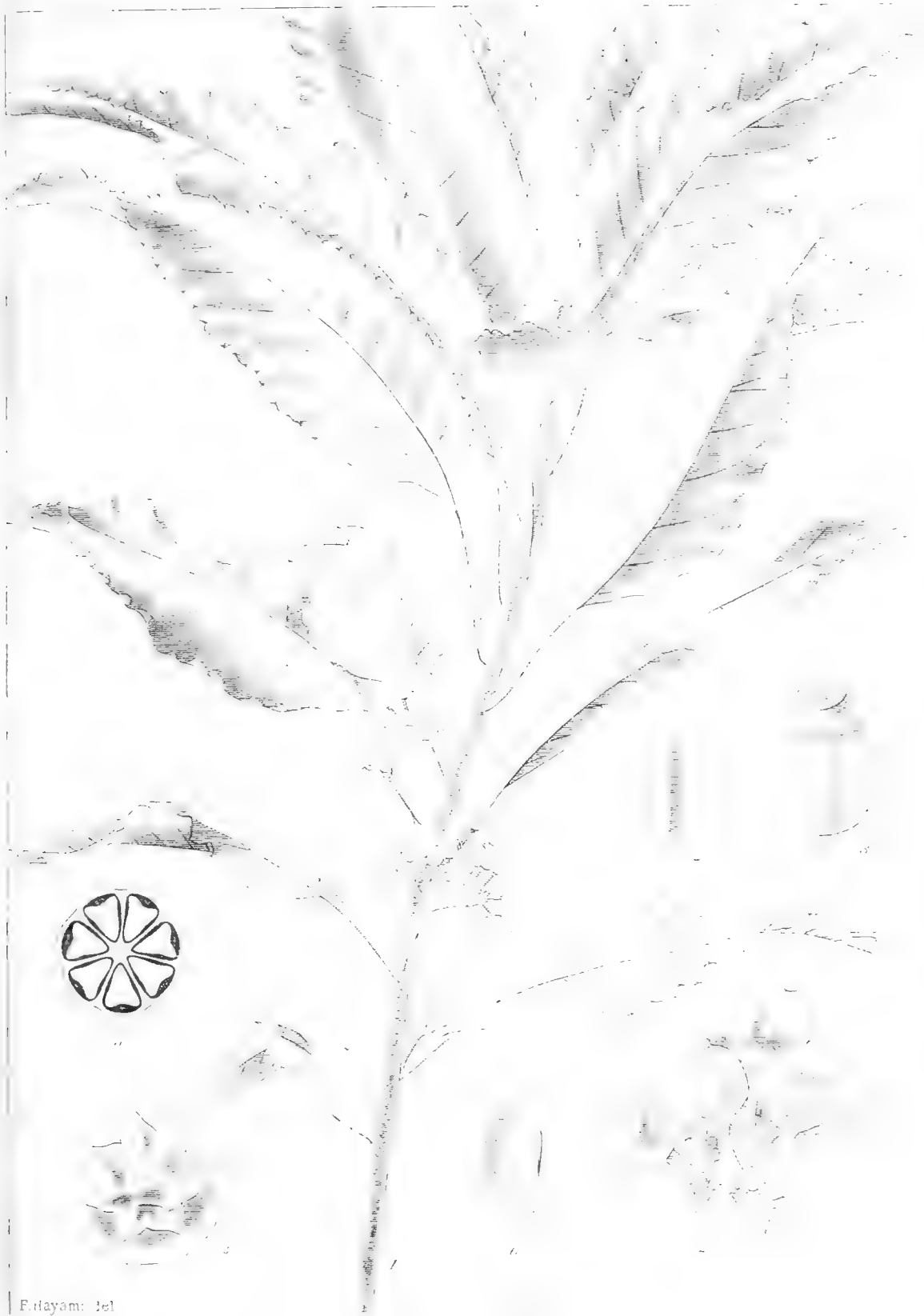
III.

PLATE IX.

### **Explanation of Pl. IX.**

*Ilex micrococca* var. *longifolia* HAYATA.

- Fig. 1. A branch.  
2. Portion of inflorescence.  
3. A fruit.  
4. The same, seen from below.  
5. Cross section of the same.  
6. 7. Seeds, seen from different sides.





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III.

PLATE X.

### Explanation of Pl. X.

*Euonymus pellucidifolius* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower.  
4. The same, seen from below.  
5. The same, in vertical section.  
6. A petal.  
7. 8. Stamens, seen from different sides.







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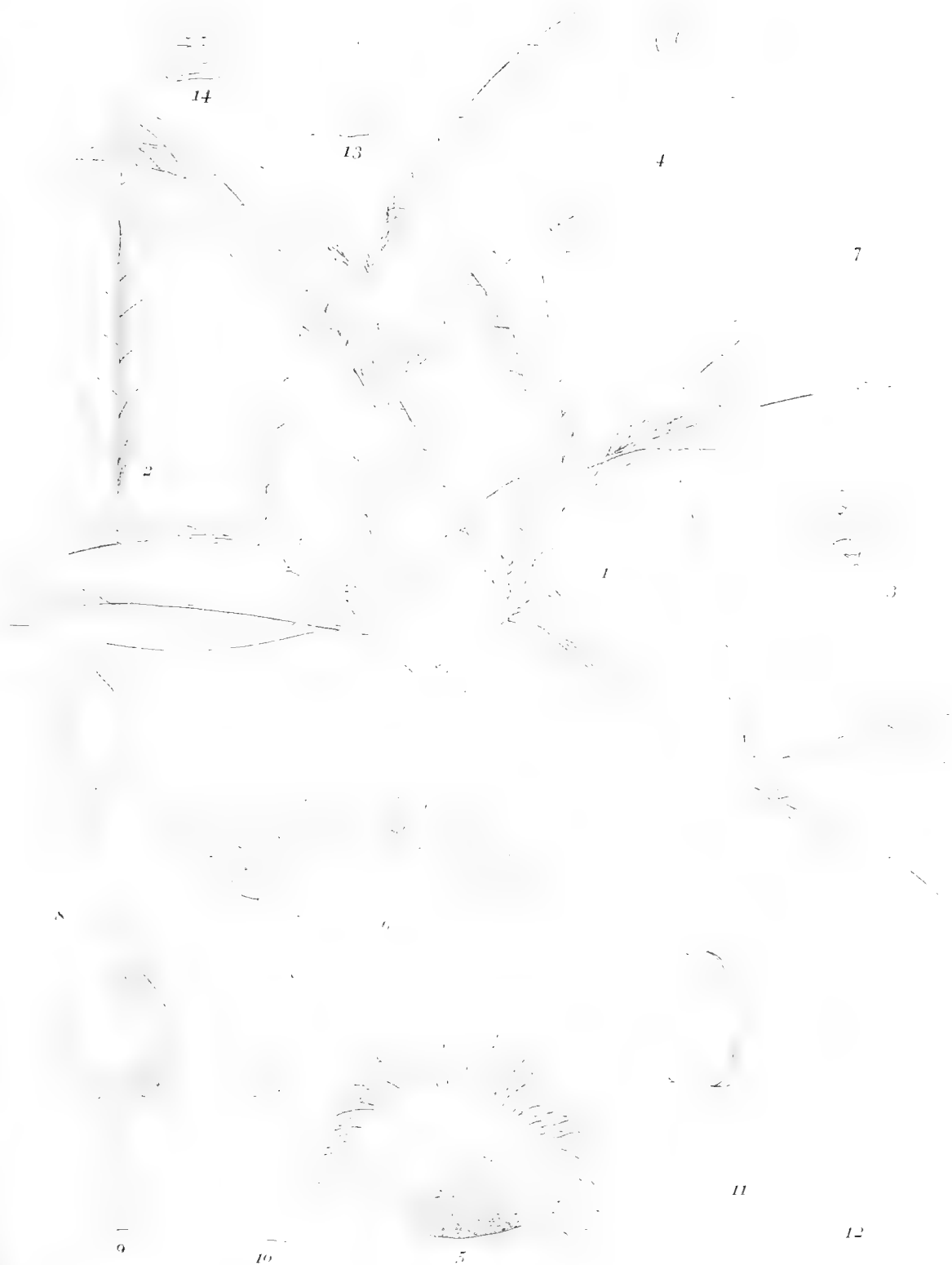
III.

PLATE XI.

## Explanation of Pl. XI.

*Cassia ilicifolia* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower.  
4. A bract.  
5. A sepal.  
6. Corolla, expanded.  
7. A petal.  
8. 9. 10. 11. 12. Stamens, seen from different sides.  
13. An ovary (rudimentary).  
14. Cross section of the same.





ICONES PLANTARUM FORMOSANARUM.

III.

PLATE. XII.

## Explanation of Pl. XII.

*Cissus pteroclada* HAYATA.

- Fig. 1. The plant.  
2. Cross section of the stem.  
3. Part of inflorescence.  
4. A flower, two petals are taken off to show the stamens and pistil.  
5. Petals.  
6. 7. 8. Stamens, seen from different sides.  
9. An ovary.  
10. Vertical section of the same.  
11. Cross section of the same.







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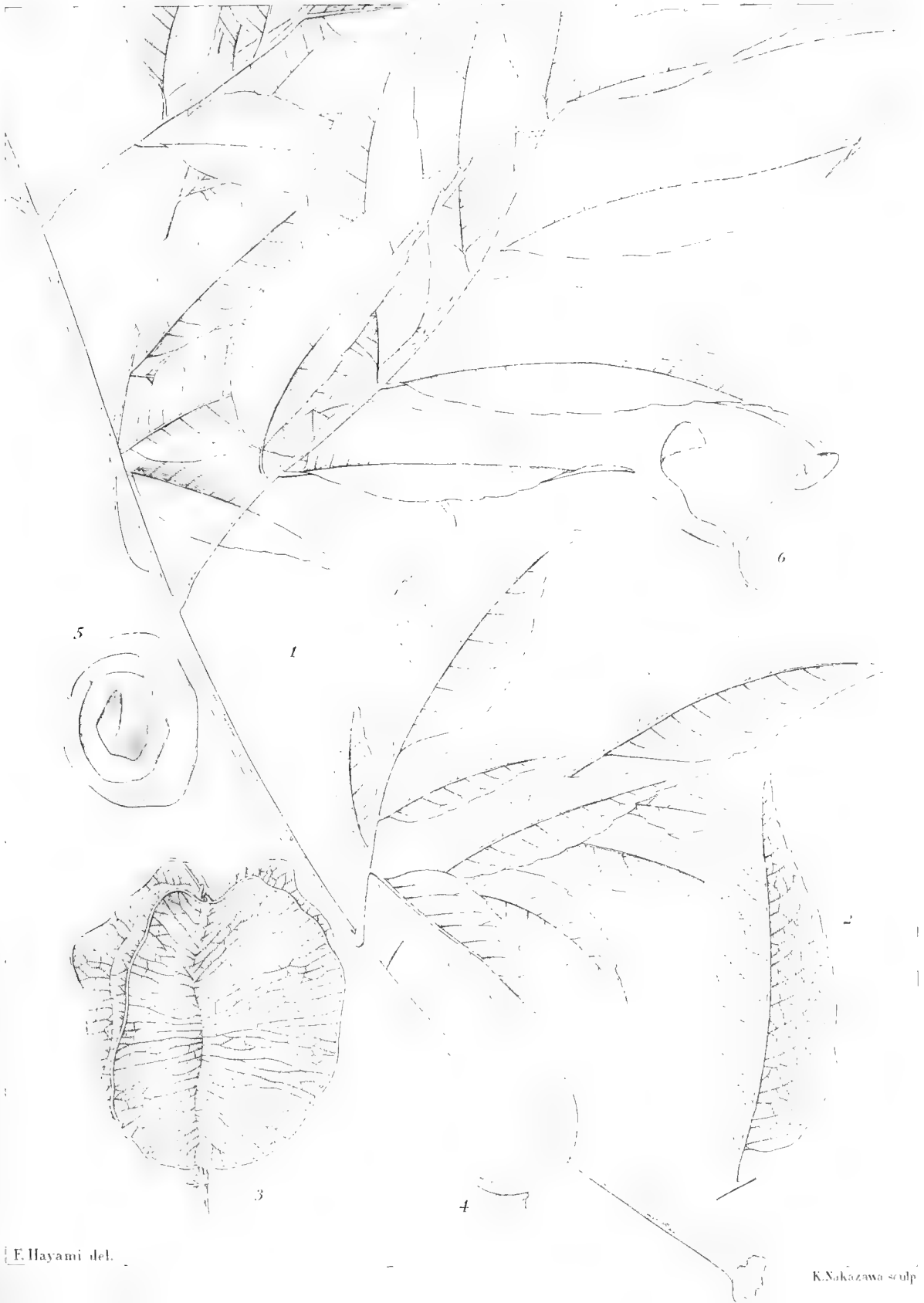
III.

PLATE XIII.

### Explanation of Pl. XIII.

*Kerolentaria formosana* HAYATA.

- Fig. 1. A leaf.  
2. A leaflet.  
3. A fruit.  
4. A seed.  
5. An embryo.  
6. The same, expanded.





ICONES PLANTARUM FORMOSANARUM.

III.

PLATE XIV.

**Explantaion of Pl. XIV.**

A. *Acer cinnamomifolium* HAYATA.

B. *Acer litseæfolium* HAYATA.

C. *Acer hypoleucum* HAYATA.

- Fig. 1. A branch of *A. cinnamomifolium*.  
2. A flower of the same species.  
3. A branch of *A. litseæfolium*.  
4. A fruit of the same species.  
5. A branch of *A. hypoleucum*.  
6. A fruit of the same species.







ICONES PLANTARUM FORMOSANARUM.

III.

PLATE XV.

### Explanation of Pl. XV.

*Lespedeza pseudomacrocarpa* HAYATA.

- Fig. 1. A branch.  
2. A leaf, one of the leaflets taken off.  
3. Petals, stamens and a pistil.  
4. Calyx, expanded.  
5. A pod.





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III.

PLATE XVI.

### Explanation of Pl. XVI.

*Euclresta Horsfieldii* var. *formosana* HAYATA.

- Fig. 1. A branch.  
2. Petals, stamens and pistil.  
3. Apical portion of calyx (expanded).  
4. A fruit.







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III.

PLATE XVII.

### Explanation of Pl. XVII.

*Sanguisorba formosana* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A leaflet.  
4. A flower-head.  
5. A flower.  
6. A bract.  
7. A sepal.  
8. A flower, stamens taken off.  
9. 10. 11. Stamens, seen from different sides.  
12. Cross section of an ovary.





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III.

PLATE XVIII.

### Explanation of Pl. XVIII.

*Clarysoplegium formosum* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A flower-bud.  
4. A flower, expanded.  
5. Vertical section of the same.  
6. A stamen.







ICONES PLANTARUM FORMOSANARUM.

III.

PLATE XIX.

## Explanation of Pl. XIX.

*Eustigma oblongifolium* GORDN. et CHAMP.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower.  
4. A bract.  
5. A hair on the calyx.  
6. A calyx-lobe with a stamen.  
7. 8. Petals, seen from different sides.  
9. 10. 11. Stamens, seen from different sides.  
12. A flower in vertical section.  
13. A style.  
14. A fruit-bearing raceme.  
15. Vertical section of a fruit.  
16. 17. Seeds, seen from different sides.





ICONES PLANTARUM FORMOSANARUM.

III.

PLATE XX.

### Explanation of Pl. XX.

*Cerlops Candolleana* ARN. var. *Sasakii* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower.  
4. The same, sepals and petals partially taken off; sepals, petals, stamens and a pistil are seen.  
5. A sepal.  
6. A petal.  
7. 8. A stamen, seen from different side.  
9. A pistil.







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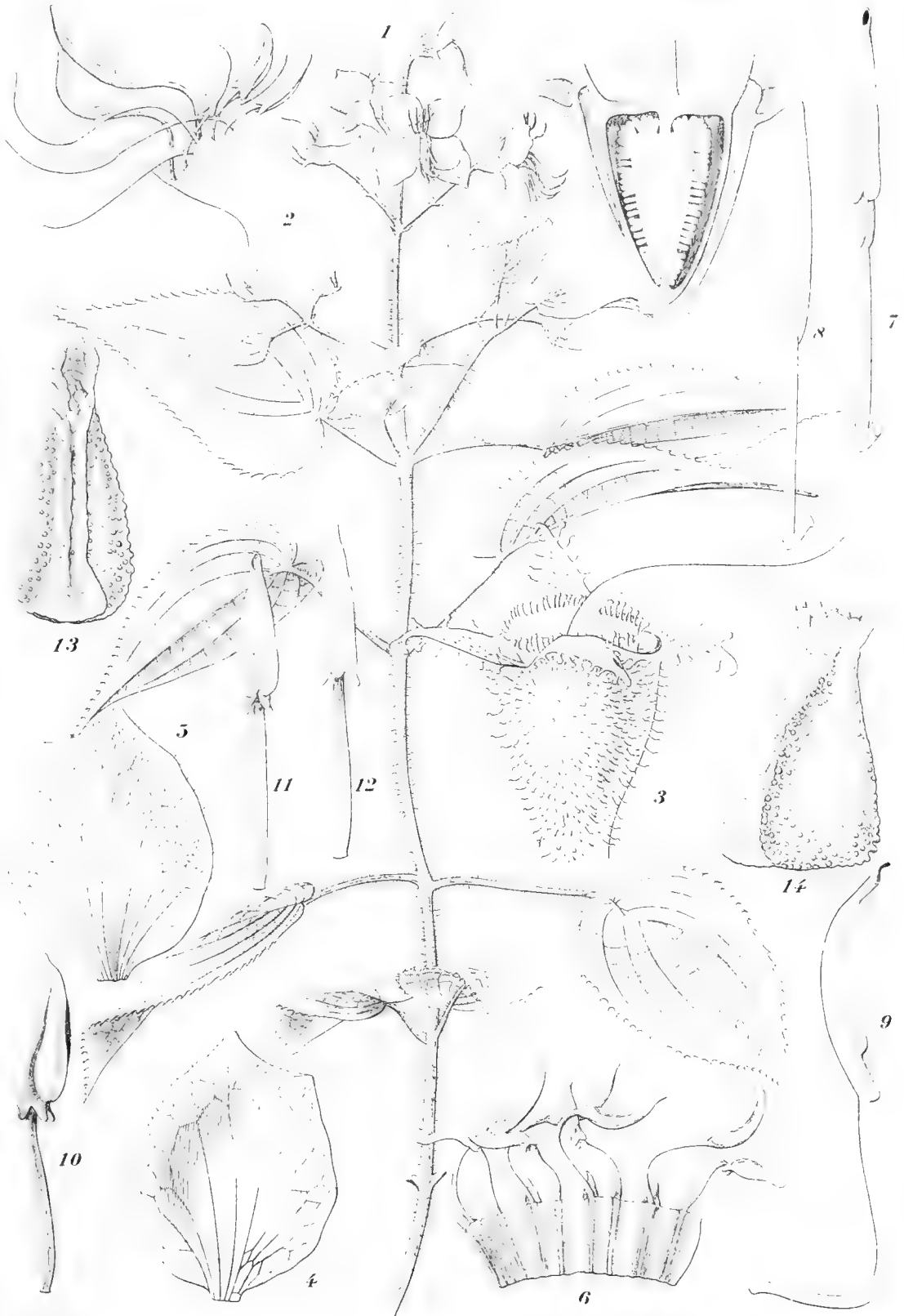
III.

PLATE XXI.

## Explanation of Pl. XXI.

*Bredia scandens* HAYATA.

- Fig. 1. The plant.  
2. A flower.  
3. The same, petals and stamens taken off.  
4. A petal, seen from within.  
5. The same, seen from without.  
6. Calyx, expanded.  
7. 8. 9. Stamens of one kind, seen from different sides.  
10. 11. 12. Stamens of the other kind, seen from different sides.  
13. 14. Seeds, seen from different sides.





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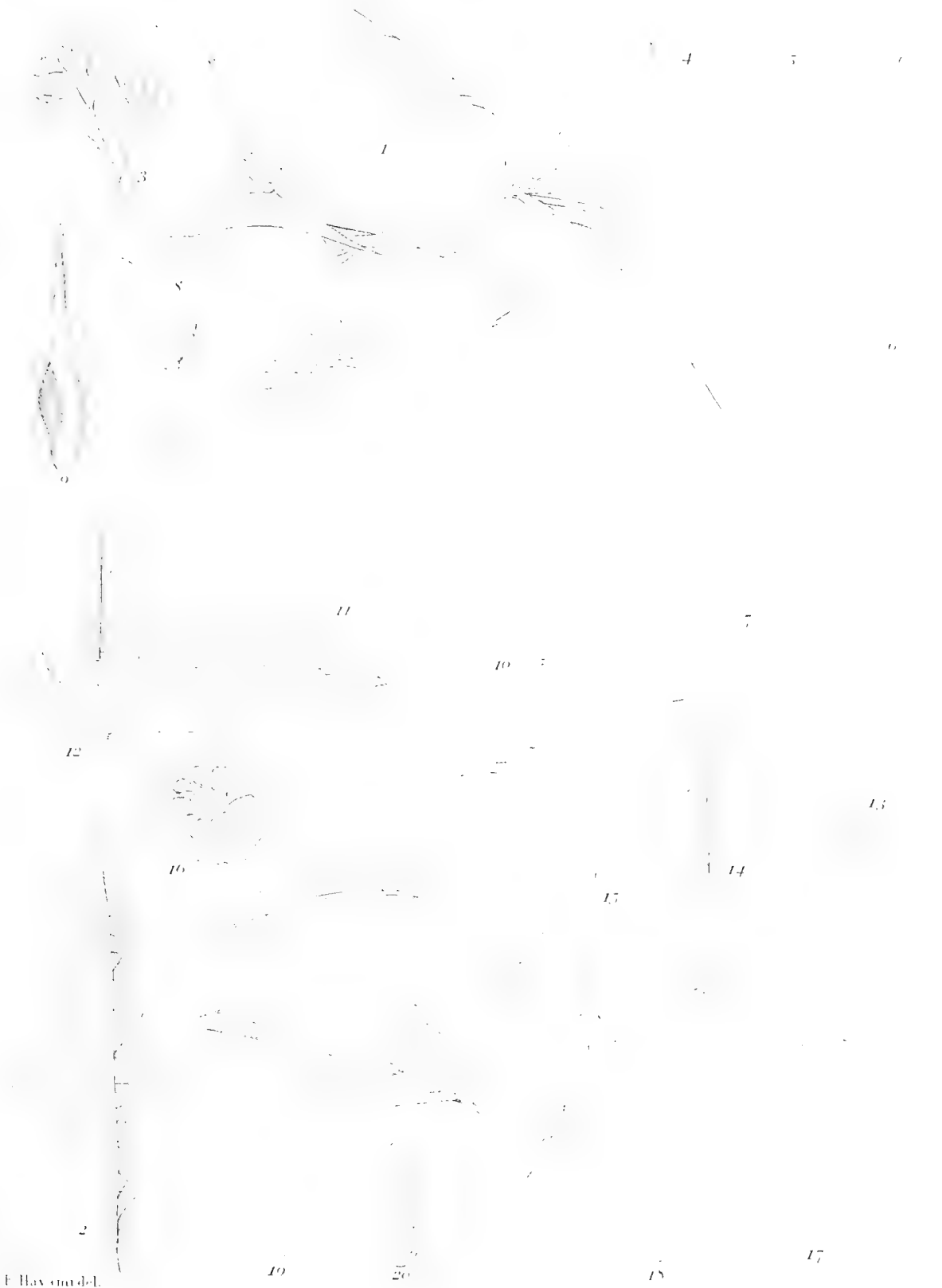
**III.**

PLATE XXII.

## Explanation of Pl. XXII.

*Vaccinium caudatifolium* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A raceme.  
4. An outer scale of a bud of a raceme.  
5. A middle scale of the same.  
6. An inner scale of the same.  
6a. The inner-most scale of the same.  
7. A portion of the outer surface of the same, showing glandular hairs.  
8. Two bracteoles.  
9. A bract.  
10. A flower.  
11. Corolla, expanded.  
12. Calyx and ovary.  
13. 14. 15. Stamens, seen from different sides.  
16. Cross section of an ovary.  
17. A fruit.  
18. A seed.  
19. Albumen.  
20. Vertical section of the same, showing an embryo.







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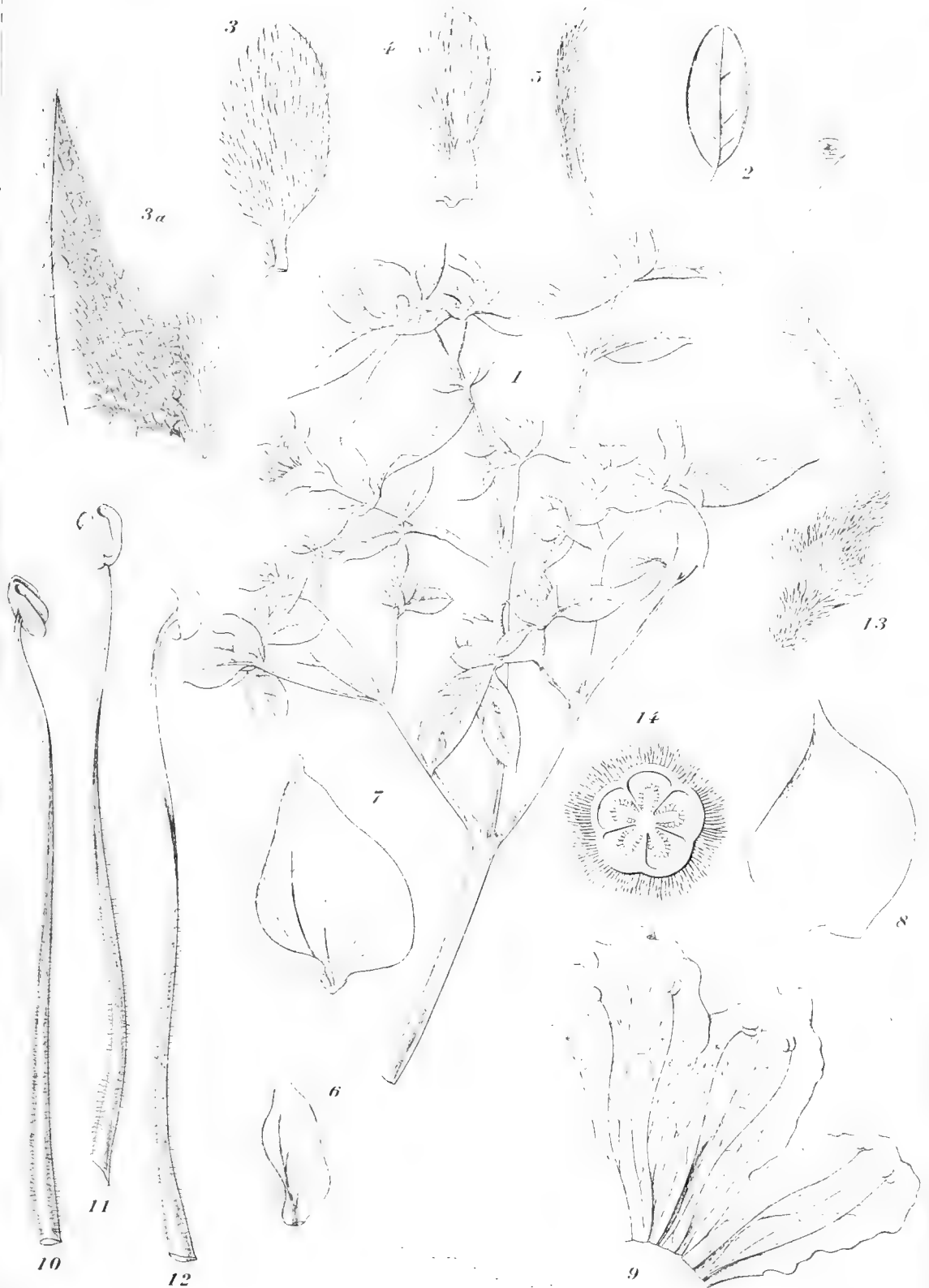
**III.**

PLATE XXIII.

### Explanation of Pl. XXIII.

*Rhododendron caryophyllum* HAYATA.

- Fig. 1. A branch.  
2. A leaf, showing the lower surface, (natural size).  
3. The same, showing the upper surface (slightly magnified).  
3a. A portion of the under surface of a leaf.  
4. A bract.  
5. A bracteole.  
6. An outer bract.  
7. An inner bract.  
8. The inner-most bract.  
9. Corolla, expanded.  
10. 11. 12. Stamens.  
13. An ovary.  
14. Cross section of the same.



F. Hayami del.

T. Arai sculp.



ICONES PLANTARUM FORMOSANARUM.

III.

PLATE XXIV.

### Explanation of Pl. XXIV.

*Rhododendron leiopodum* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower, expanded.  
4. 5. 6. 7. Bracts, outer to inner.  
8. 9. 10. Stamens.  
11. An ovary.  
12. Stigma.  
13. Cross section of an ovary.







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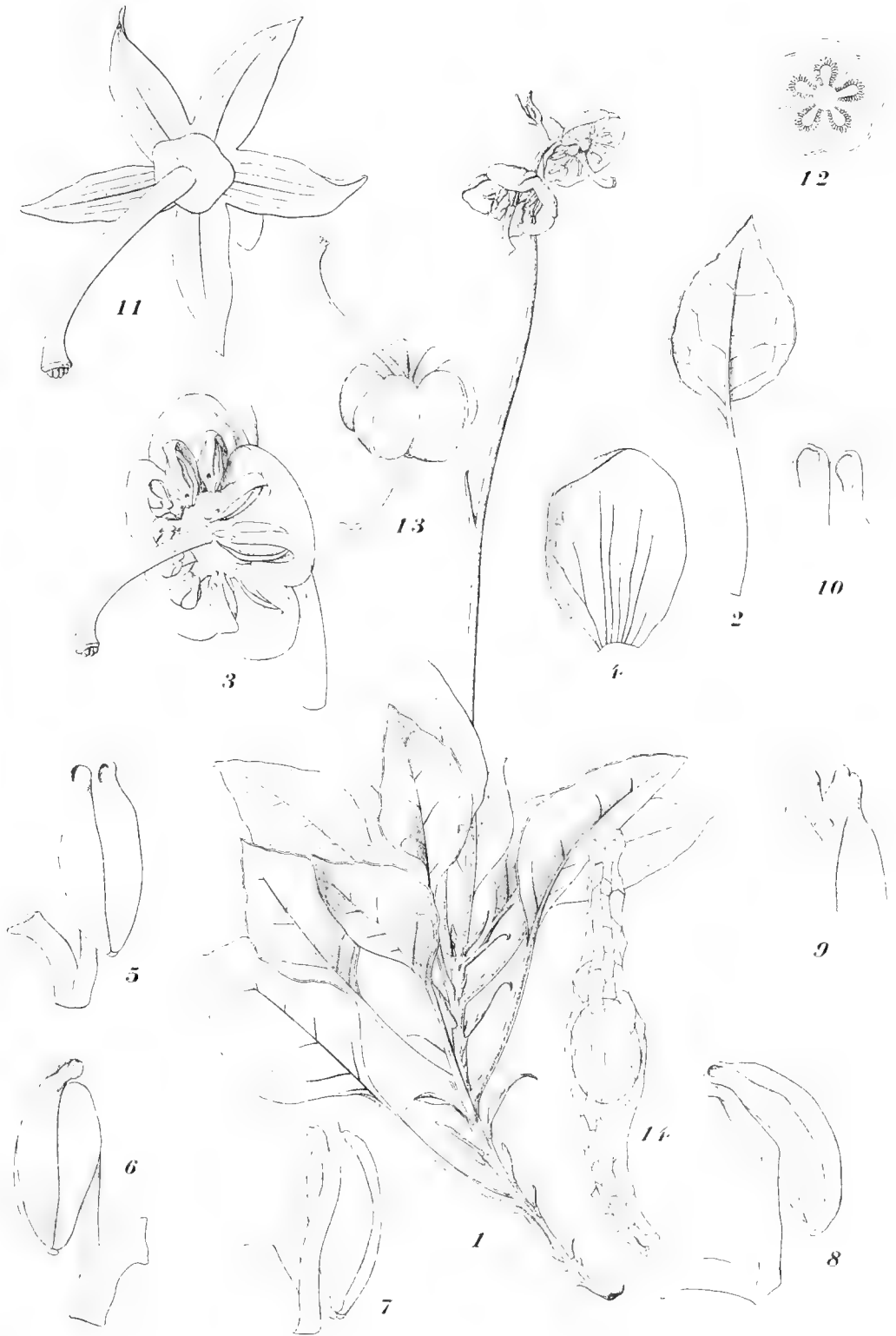
III.

PLATE XXV.

## Explanation of Pl. XXV.

*Pyrola albo-reticulata* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A flower.  
4. A petal.  
5. 6. 7. 8. Stamens, seen from different sides.  
9. 10. Apical portions of a stamen, seen from different sides.  
11. A flower, petals and stamens, taken off.  
12. Cross section of an ovary.  
13. A fruit.  
14. A seed.





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III.

PLATE XXVI.

### Explanation of Pl. XXVI.

*Pyrola morrisonensis* HAYATA.

- Fig. 1. The plant.  
2. A petal.  
3. A flower, petals and stamens taken off.  
4. 5. 6. Stamens, seen from different sides.  
7. Cross section of an ovary.  
8. Apical portion of a style.  
9. A fruit.  
10. A seed.







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III.

PLATE XXVII.

4

## Explanation of Pl. XXVII.

*Shortia exappendiculata* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A marginal portion of a leaf, seen from below.  
4. The same, seen from above.  
5. A flower.  
6. Corolla, expanded.  
7. A stamen.  
8. A flower, corolla and stamens taken off.  
9. Cross section of an ovary.  
10. An ovule.  
11. Apical portion of a style, showing the stigma.  
12. A fruit.  
13. Valves of the same.  
14. A valve.  
15. 16. Seeds, seen from different sides.  
17. Portion of the seed-coat, showing its reticulation.





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III.

PLATE XXVIII.

### Explanation of Pl. XXVIII.

*Chionanthus serrulatus* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. Calyx.  
4. A flower.  
5. Corolla, expanded.  
6. 7. 8. Stamens, seen from different sides; the attaching parts  
of the filaments to the corolla are shaded.







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III.

PLATE XXIX.

**Explanation of Pl. XXIX.**

*Fagrea Sasakii* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower.  
4. Corolla, expanded.  
5. A corolla-lobe.  
6. 7. Stamens, seen from different sides.  
8. An ovary.





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III.

PLATE XXX.

### Explanation of Pl. XXX.

*Maculilus longipaniculata* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower.  
4. A sepal.  
5. An inner sepal.  
6. Limb of the calyx, expanded.  
7. 8. 9. Stamens of one kind, seen from different sides.  
10. 11. 12. Staminodes of one kind.  
13. 14. 15. Staminodes of the other kind.







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III.

PLATE XXXI.

### Explanation of Pl. XXXI.

*Balanophora mutinoides* HAYATA.

- Fig. 1. A male plant.  
2. Portion of the flower-head, seen from above.  
3. A male flower.  
4. The same, seen from above.  
5. A female plant.  
6. A portion of the flower-head.  
7. A columella with female flowers at its base.  
8. The same in cluster.  
9. Cross section of a female flower-head.

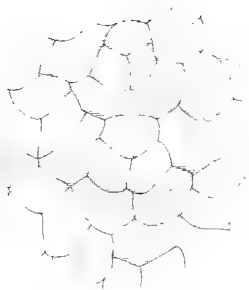


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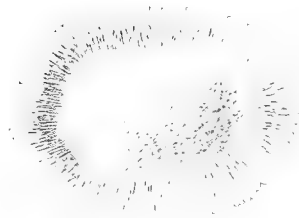
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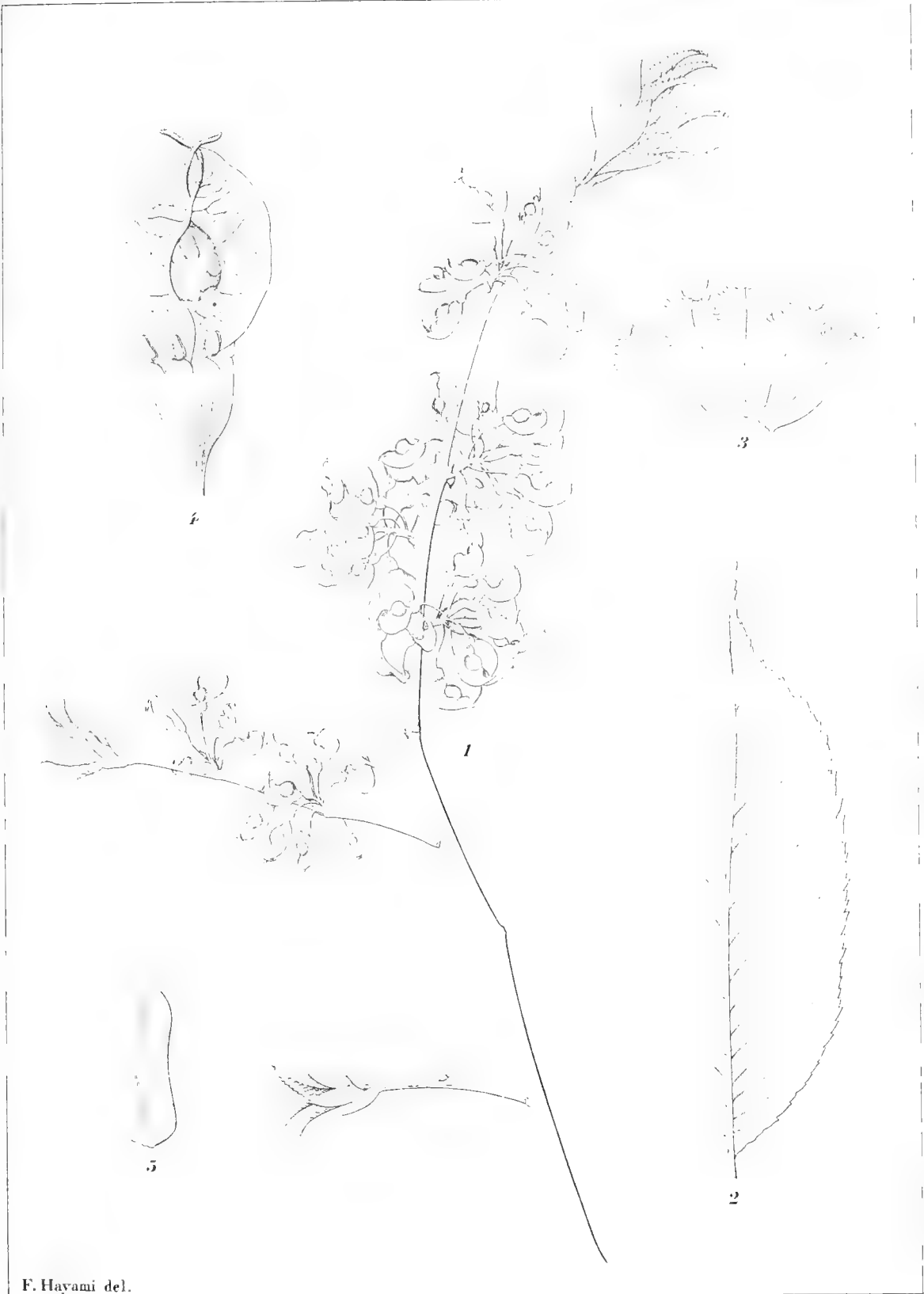
III.

PLATE XXXII.

**Explanation of Pl. XXXII.**

*Ulmus Uyematsui* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. Calyx and stamens, expanded.  
4. A young fruit.  
5. A seed.







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III.

PLATE XXXIII.

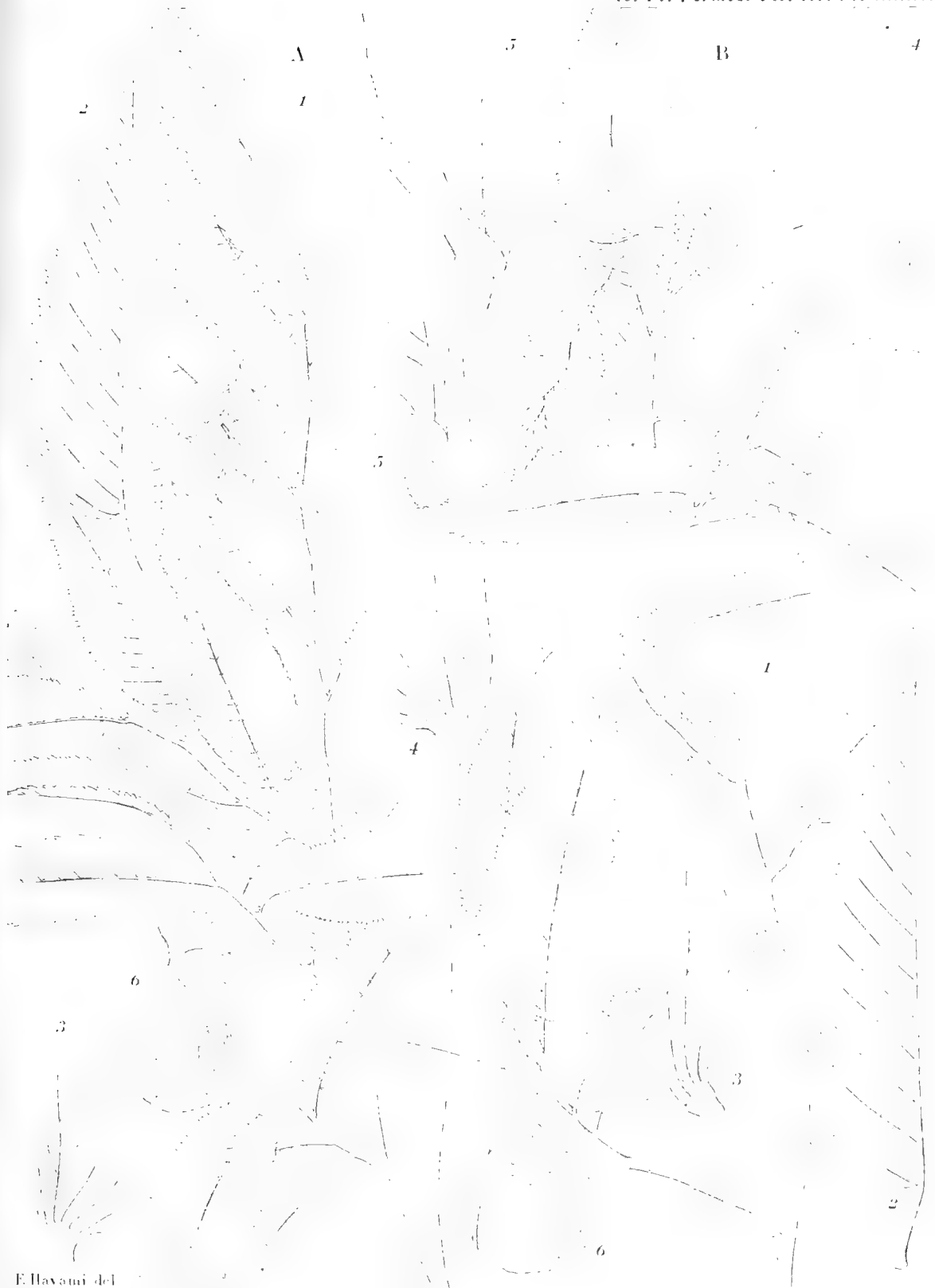
### Explanation of Pl. XXXIII.

A. = *Carpinus minutiserrata* HAYATA.

- Fig. 1. A branch.  
2. A half of a leaf, showing its under surface.  
3. 4. 5. Fruit-bearing bracts seen from different sides, (in 4, a fruit taken off.).  
6. A fruit.

B. = *C. Kawakamii* HAYATA.

- Fig. 1. A branch.  
2. A half of a leaf.  
3. 4. 5. Fruit-bearing bracts, seen from different sides, (in 4, a fruit taken off.).  
6. A fruit.



*E. havanensis* del



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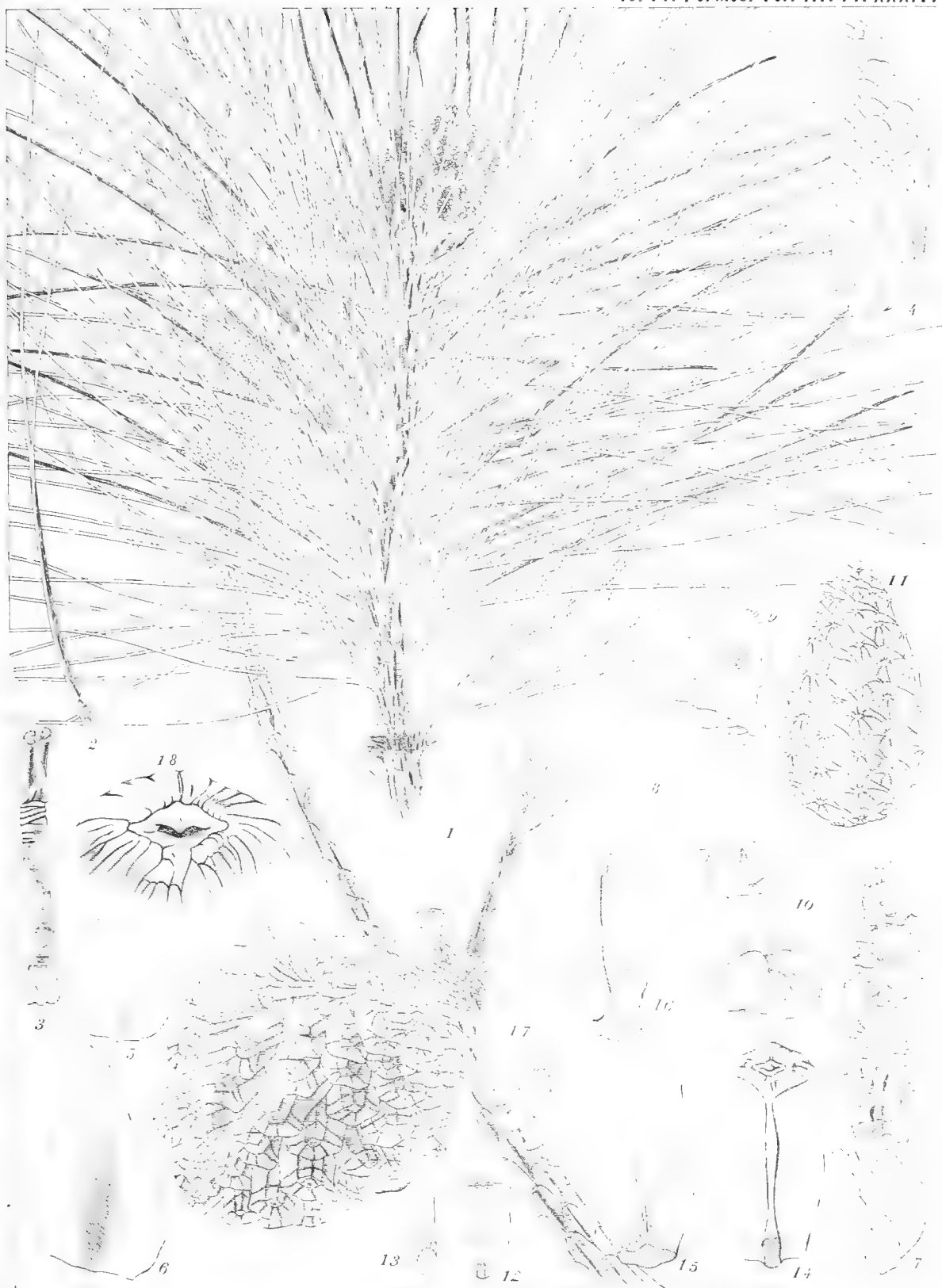
III.

PLATE XXXIV.

## Explanation of Pl. XXXIV.

*Pinus brevispica* HAYATA.

- Fig. 1. A branch with flowers and cones.  
2. A two-leaved branchlet.  
3. Basal portion of the same.  
4. A male flower-bud.  
5. 6. Bracts of the same.  
7. A male flower.  
8. 9. 10. Stamens, seen from different sides.  
11. A cone.  
12. A scale, taken from the middle portion of the cone (n. s.).  
13. A winged seed, (n. s.).  
14. A scale taken from the middle portion of a cone, (neary two times).  
15. 16. The same, seen from within, one with seeds, the other without seeds.  
17. A seed, seen from side, (magnified).







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III.

PLATE XXXV.

### **Explanation of Pl. XXXV.**

*Pinus Uyematsui* HAYATA.

- Fig. 1. A cone-bearing branch.  
2. Basal portion of a five leaved branchlet, seen from front.  
3. The same, seen from side.  
4. Cross section of a leaf.  
5. A cone, after dissemination.  
6. A scale taken from the middle portion of the cone (n. s.).  
7. A seed (n. s.).















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